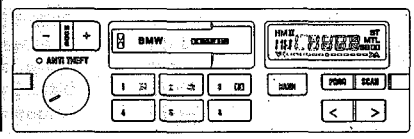
PIONEER®
The Art of Entertainment

Service Manual



ORDER NO.
CRT1485

ANTI-THEFT CD-READY RADIO

KE-93ZBM

US, X1H

Note:

- **See the separate manual CX-156 (CRT-468) for the cassette mechanism description.**
- **Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.**

- **BMW No. 90 88 1 600 300**

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1. SPECIFICATIONS

TUNER

FM Receiver

Usable Sensitivity (Load)	
[30 dB (N + D)/(S + N + D)]	1 μV
Signal/Noise Ratio (1 mV)	65 dB
Overload Signal	1 V
AM Rejection	40 dB
IF Rejection	100 dB
Image Rejection	50 dB
Spurious Rejection	70 dB
Alternate Channel Selectivity	60 dB
Capture Ratio	2 dB
Stereo Separation (1 kHz)	40 dB
Stereo Distortion (1 mV)	0.5 %
Frequency Range	87.7 to 107.9 MHz
Intermediate Frequency	10.7 MHz

AM Receiver

Usable Sensitivity [20 dB N/(S + N)]	10 μV
Signal/Noise Ratio (5 mV)	50 dB
Selectivity (± 10 kHz)	100 dB
IF Rejection	100 dB
Image Rejection	60 dB
Distortion (5 mV RF)	0.5 %
Frequency Range	530 to 1710 kHz
Intermediate Frequency	450 kHz

CASSETTE DECK

Wow and Flutter WRMS-JIS	0.07 %
Signal/Noise Ratio	50 dB
Dolby® B NR Effect	10 dB
Separation	50 dB
Cross Talk	55 dB
Distortion	1 %
Frequency Response (— 3 dB)	
Normal	40 Hz to 15 kHz
Metal	40 Hz to 18 kHz

AUDIO CONTROL

Tone Control Response	
Treble Boost/Cut 10 kHz	± 10 dB
Bass Boost/Cut 100 Hz	± 10 dB

POWER AMPLIFIER

Power Output (R_L = 4 Ω, Vcc = 14.4 V)	
10 % THD	5.5 W/Ch
1 % THD	4.5 W/Ch
THD (R_L = 4 Ω, Vcc = 14.4 V)	
Po = 1 W	0.7 %
Frequency Response	
(± 3 dB)	20 Hz to 40 kHz
Signal/Noise Ratio	65 dB

2. FEATURE DESCRIPTIONS

- Anti-theft microprocessor system.
- Digital phase-locked loop frequency synthesizer automatically tunes and locks onto the broadcast frequency indicated on the frequency display.
- Automatic tape equalization (70 μsec. or 120 μsec.).
- Separate bass, treble, fader and balance control.
- Seek tuning for radio.
- Up-scan tuning for radio.
- Programmable memory for 12 FM (6 each for FM1 and FM2) and 6 AM stations.
- Ignition-key-off pause mode for tapes.
- Maintenance indication for tape deck (every 15 hours of use).
- Triple function buttons for radio preset, tape operation, and optional CD operation.
- Electronic tuning.
- Power loading/soft eject.
- Automatic local/distance attenuation.
- Dolby® B noise reduction for tape.
- Auto reverse at end of tape.
- Tape skip blank.
- Tape scan.
- Built-in automatic tape slack canceler (ATSC).
- Rotating tape head.
- Automatic Loudness control.
- Telephone muting. (Optional)
- Multi-play Compact Disc player capability.

3. DISASSEMBLY

●Removing the case unit

1. Insert and turn a screwdriver at locations indicated by arrows to remove the case unit.

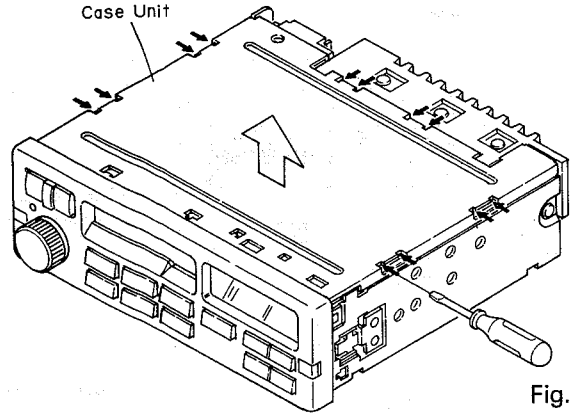


Fig. 1

●Removing the grille assy

1. Remove knob.
2. Press tab at five locations indicated by arrows, and pull out grille assy.

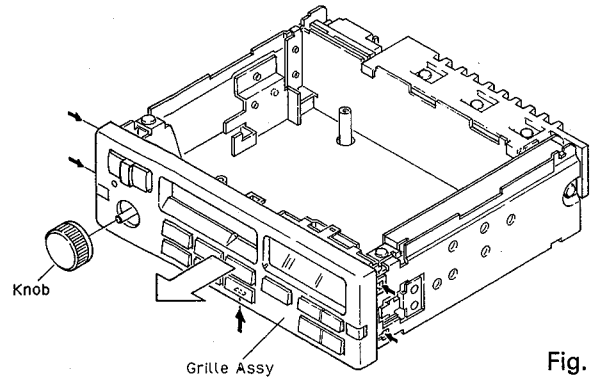


Fig. 3

●Removing the key board unit

1. Remove the three screws.
2. Press tab at three locations indicated by arrows, and remove the key board unit.

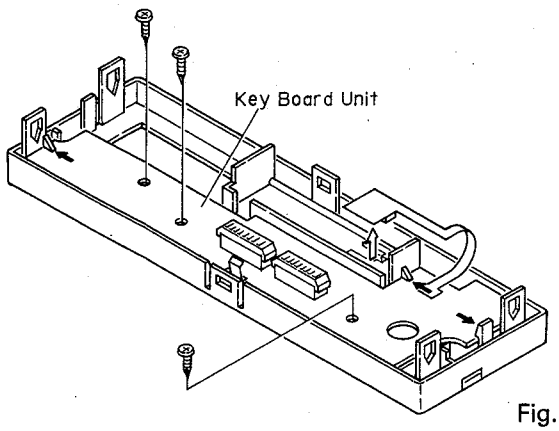


Fig. 5

●Removing the cassette mechanism assy

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the cassette mechanism assy.

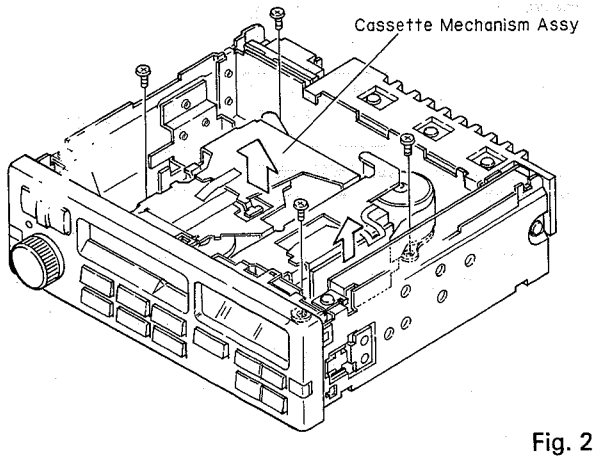


Fig. 2

●Removing the chassis assy

1. Remove the seven screws.
2. Unbend the claw indicated by arrow until straight.
3. Remove the chassis assy.

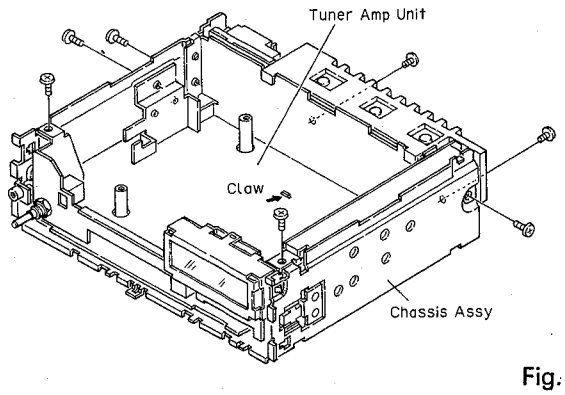
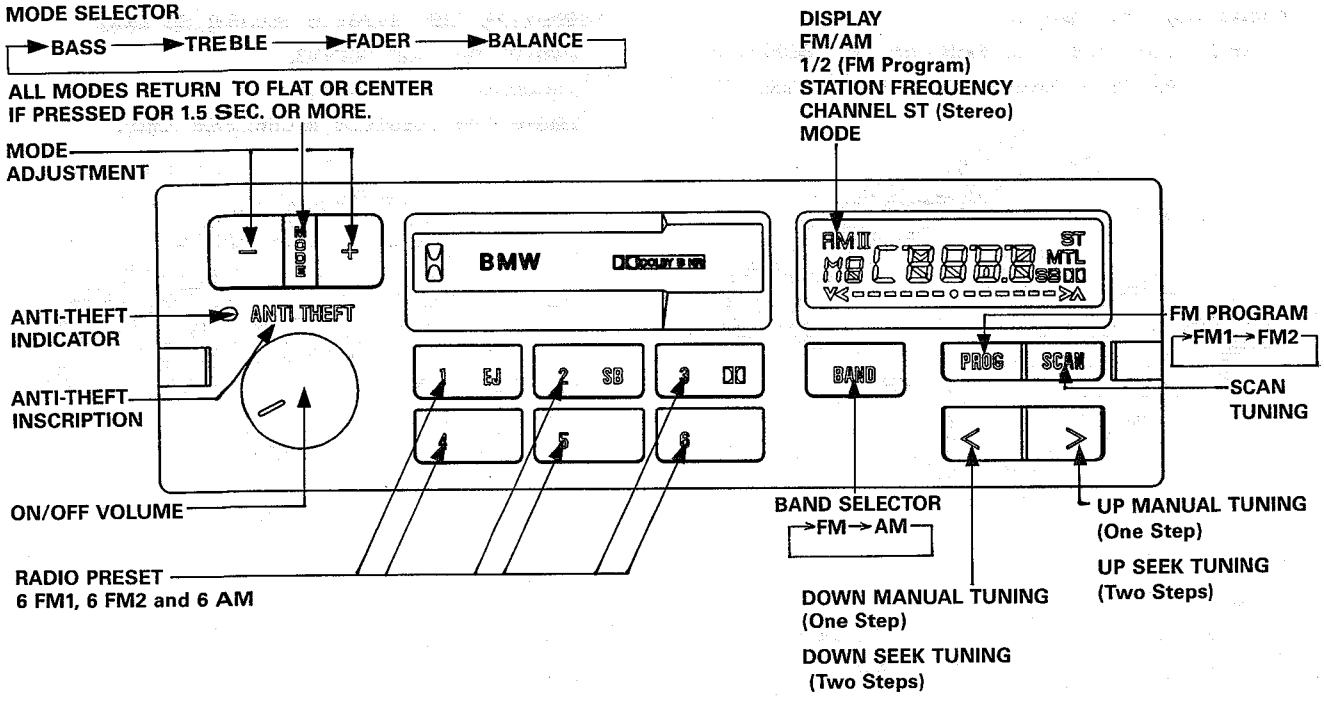


Fig. 4

4. RADIO MODE CONTROL LOCATION AND OPERATION



OPERATING THE RADIO

FM/AM

Press the BAND button and FM or AM will appear on the display indicating which band is being received. When FM or AM is chosen, the currently tuned frequency is also displayed. Press the button to change from band to band. There are two FM program selections: FM1 and FM2. Press the PROG button to switch between them.

MANUAL/SEEK TUNING

The TUNING buttons are used for both manual and seek tuning. For manual tuning, press either of the tuning buttons one step. To tune to a higher frequency, press the right button; to tune to a lower frequency, press the left button. For seek tuning, press the right or left button 2 steps (as far as it will go). The radio will automatically tune and lock onto the next higher or lower receivable broadcast frequency. When seek tuning the next higher or lower frequency, the display shows SEEK.

STEREO

The ST indicator will light up on the display whenever a stereo station is received. The indicator will flash when signal strength diminishes.

AUTOMATIC LOCAL/DISTANCE SWITCHING

New electronic circuitry automatically selects the local/distance mode for best reception, eliminating the need for manual switching.

SCAN TUNING

Signal scan tuning allows you to tune into each medium-to-strong frequency pausing seven seconds at each. Push the SCAN button once to begin tuning up scale, and press it again during a pause to stop the scanning. The display shows SCAN during scan tuning.

FM RECEPTION

Signal reflections or blockages caused by hills or tall buildings may cause hissing and fluttering noises in FM reception. FM signal strength diminishes beyond 25 miles from the transmitter.

PROGRAMMING/REPROGRAMMING PRESET STATIONS

Tune in the desired radio station. Then push a PRESET selection button for 1.5 seconds. When you hear a beep, the frequency has been memorized. Repeat this procedure for the remaining preset station selectors on the FM (FM1 and FM2) and AM bands.

NOTE: The radio programming controls have triple functions. Each button can be set to one FM1, one FM2 and one AM station.

BASS, TREBLE, FADER AND BALANCE CONTROL

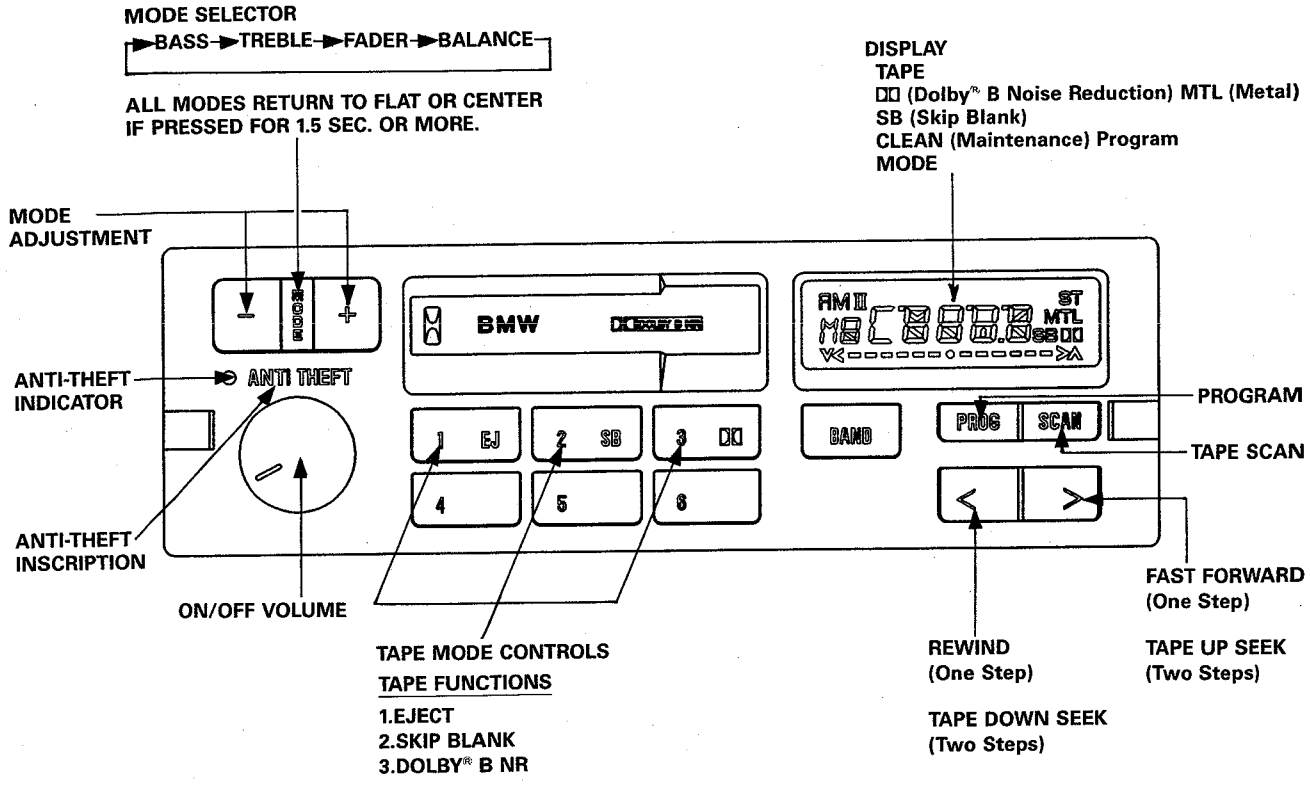
Each time the MODE button is pressed, control of bass, treble, fader, or balance is selected in turn. The selected mode is shown on the display and can be adjusted by the + and — buttons. Approximately five seconds after adjustment, the display returns to its previous state.

When the MODE button is pressed continuously for more than 1.5 seconds, the level of each mode returns to flat or center. At this time a beep is sounded "FLAT" is displayed on the display.

TELEPHONE MUTING

Should your BMW vehicle be equipped with the cellular telephone with muting feature, the radio volume will be reduced (gradually) when an incoming telephone call is received. Tape cassette/compact disc functions will automatically go into a pause mode. Radio volume is restored after the telephone call has been completed as are tape cassette/compact disc functions.

5. TAPE MODE CONTROL LOCATION AND OPERATION



■ OPERATING THE CASSETTE PLAYER

CASSETTE OPERATION

To use the cassette player, turn the radio on. When a cassette is inserted, the unit will switch automatically from radio to tape mode.

FAST FORWARD/REWIND*

The fast forward/rewind button has a two-step operation. Press the right side of button one step to fast forward; Press the left side of button one step to rewind. Repeat the same action to stop the appropriate function. The logic circuitry in your radio will automatically determine the right direction for fast forward or rewind. While the tape is fast forwarding, the display shows FF; while the tape is rewinding, it shows RW.

A standard cassette has two sides and can be played in either direction. When in play, the top side of a cassette will be indicated as "1" on the display. The bottom side will appear as "2".

REVERSING TAPE DIRECTION

To reverse tape direction, push the PROG button. Additionally the tape will reverse automatically when a side is complete.

TAPE SCAN

If you wish to scan through the tape until a desired selection is found, press the SCAN button. Each selection on the tape will play for approximately 13 seconds. (The display will show SCAN.) Scanning stops when the SCAN button is pressed again.

AUTOMATIC EQUALIZATION

The playback equalization of normal tapes differs from that of chrome and metal tapes. When a high-bias tape, including metal, is inserted, the unit will automatically change to the correct equalization level, and MTL will be indicated on the display.

TAPE SEEK

Pressing the fast forward/rewind button two steps (as far as it will go) activates the seek mode. To move to the next selection on your tape, press the right side of button (as far as it will go). The display shows SEEK. The tape will move rapidly to the next selection. To restart the current selection, press the left side of button in the same manner. The display shows SEEK.

Tape Seek will only function correctly if there are four seconds of silence between the selections on your tape. Excessive noise between selections on home-recorded tapes may interfere with these functions. The cassette automatically ejects from the unit if tape setting operations cannot be completed within a few seconds. This may be caused by a faulty or damaged cassette. Determine the cause of the problem or use a different cassette.

TAPE EJECT (1 EJ)

Press the EJECT button—1 EJ—to eject tape cassette and return to the radio mode.

SKIP BLANK (2 SB)

The SKIP BLANK button—2 SB—automatically advances the tape to the next recorded portion when a blank section of tape exceeds approximately 15 seconds. When there is a long, unrecorded portion at the end of the tape, the unit advances the tape to the end and then starts to play the other side. When the SKIP BLANK button is pushed, SB Will appear on the display. if the SKIP BLANK function is active, TAPE changes to SEEK.

DOLBY® B NOISE REDUCTION (3 DD)

Use the Dolby®* B Noise Reduction button —3 DD—to reduce the level of hiss on Dolby® B-encoded cassettes. If you do not use the Dolby® B noise-reduction function with Dolby® B encoded tapes, the high-frequency response will be intensified. If you do use this function with non-encoded tapes, high-frequency response will be diminished.

*The word "Dolby" and the double-D symbol are registered trade marks of Dolby Laboratories, Inc.

IGNITION-KEY-OFF PAUSE MODE

If the ignition is turned off while a tape is tape is playing, the unit automatically enters the pause mode. The unit will return to normal play mode when the ignition is turned on. The unit will not accept another cassette when it is in the pause mode.

AUTOMATIC TAPE SLACK CANCELER (ATSC)

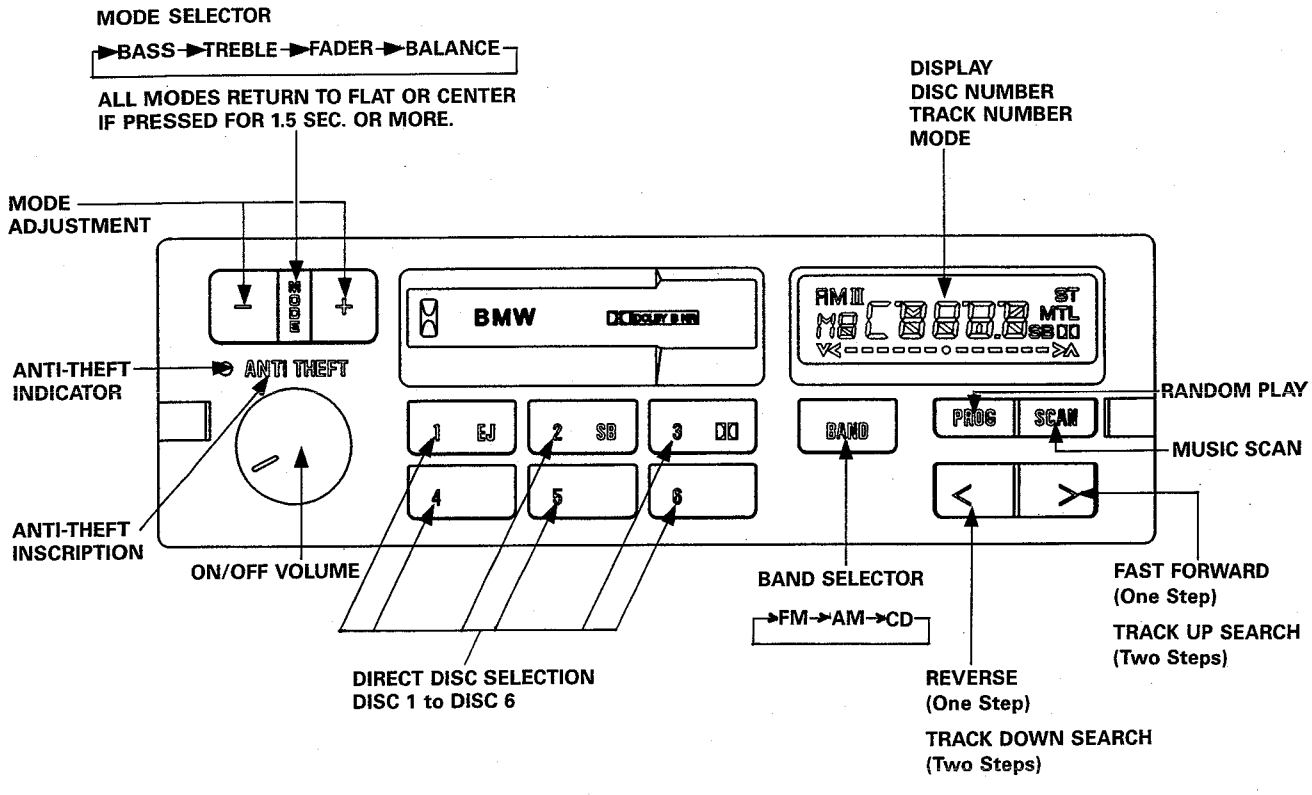
The automatic tape slack canceler removes any slack in the tape before play to protect the tape and extend its life.

ROTATING TAPE HEAD

The rotating tape head in your tape cassette player ensures accurate horizontal tape alignment in both directions for optimum sound level reproduction and frequency response.

NOTE: The BMW Anti-Theft Radio contains a full-logic computer-controlled 3-motor drive which controls the automatic tape slack canceler (ATSC) and rotating tape head mechanism. During cassette tape loading/unloading or tape transport directional changes, the motor drive emits a precision mechanical sound which is indicative of normal tape cassette player operation.

6. CD MODE CONTROL LOCATION AND OPERATION (WITH CD CHANGER OPTION)



■ OPERATING THE CD PLAYER (WITH CD CHANGER OPTION)

CD OPERATION
To use the CD player, turn the radio on and press the BAND button. The display indicates FM, AM, or CD. Select CD to switch from radio mode to CD mode.

DIRECT DISC SELECTION
DIRECT DISC SELECT buttons 1 through 6 correspond to the magazine tray numbers. When one of buttons 1 through 6 is pressed, the disc in the magazine tray corresponding to the number selected is played.

NOTE: The disc is not changed if you try to select an empty tray. The display will read "NO" for approximately 5 seconds.

FAST FORWARD/REVERSE
The fast forward/reverse button has a two step operation. Press the right side of button one step to fast forward; press the left side of button one step to reverse. During the fast forward operation, the display shows FWD; during the reverse operation, it shows REV.

TRACK SEARCH
Pressing the fast forward/reverse button two steps (as far as it will go) activates the track search mode. To advance to the next track, press the right side of button (as far as it will go). To return to the previous track, press the left side of button in the same manner. Push and hold the button down (as far as it will go) to move forward or backward through the tracks.

MUSIC SCAN
When the SCAN button is pressed, the word "SCAN" appears on the display and the player begins playing the first part (approximately 10 seconds) of each track on the current disc. Press the button again when you find a track you want to listen to: the player will return to normal playback and continue with the current track.

RANDOM PLAY
Press the PROG button for random play. (RND appears on the display.) This function randomly plays one track after another, choosing from all the tracks on all the discs in the magazine randomly. Press the PROG button again to cancel random play.

NOTE: Since tracks are selected at random, it is possible that the same track may be played twice in succession.

MAGAZINE CHECK
When there is no magazine in the CD changer, the words "NO" appears on the display to advise you to load a magazine.

NOTE: After you load a magazine, there is a short pause before playback begins. The changer is checking each of the trays for discs in the magazine. (The display indicates "LOAD".)

DISC CHECK
A "Err" indication is shown on the display and operation of the system becomes impossible when there are no discs in the magazine or when the discs are loaded into the magazine with their labels facing upwards. Whenever this message appears, remove the magazine and check the discs.

7. BLOCK DIAGRAM

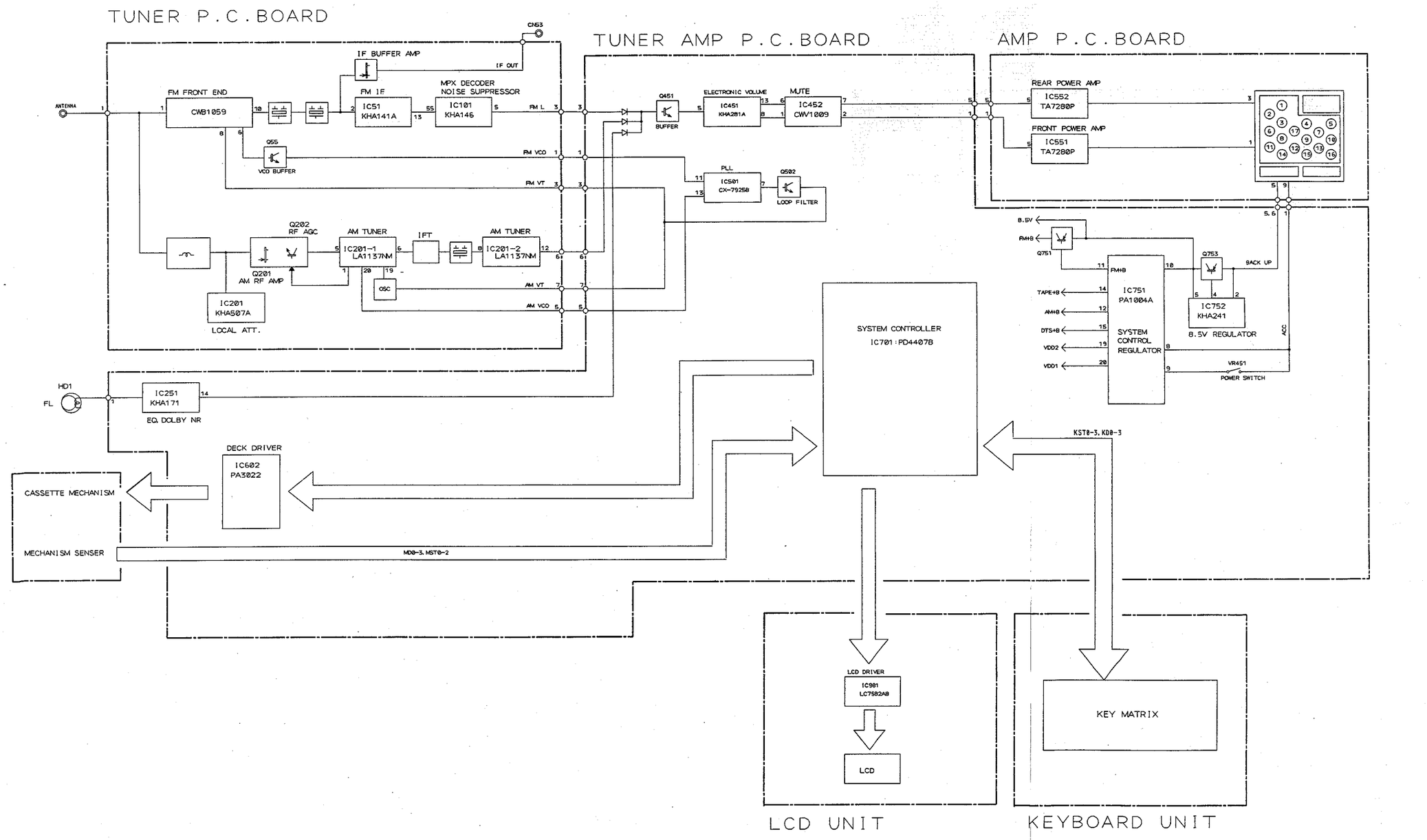


Fig. 6

8. CONNECTOR FUNCTION DESCRIPTION

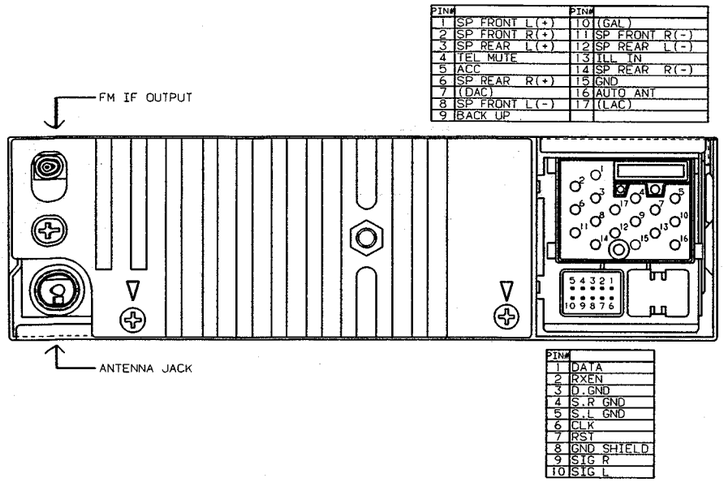


Fig. 7

9. ADJUSTMENT

9.1 TEST MODE

Test mode is mainly used in adjustment of CD multi-player.

- Switching to test mode
  While pressing the BAND, 3 keys together, switch the back-up ON.
- Canceling test mode
  Switch the CD multi-player and KE-93ZBM back-up OFF.
- Key functions during test mode
  The CD multi-player, deck and tuner are selected by the BAND key.

a) CD multi-player

Key	Function
MODE	DD converter ON/OFF
FF	FWD kick
REV	REV kick
SCAN	Tracking close
RANDOM	Tracking open
+	Focus close
–	Carriage/tracking switching

NOTE:
Concerning operation in the test mode.
(1) Continuous carriage movement is not possible by pressing the FF or REV keys. Either press the keys repeatedly or move the carriage manually.
(2) Spindle kick is not possible during focus search. Rotate the disc manually (i.e. at first rotate it a little by hand, and then it will continue to rotate).

- **Flow Chart**

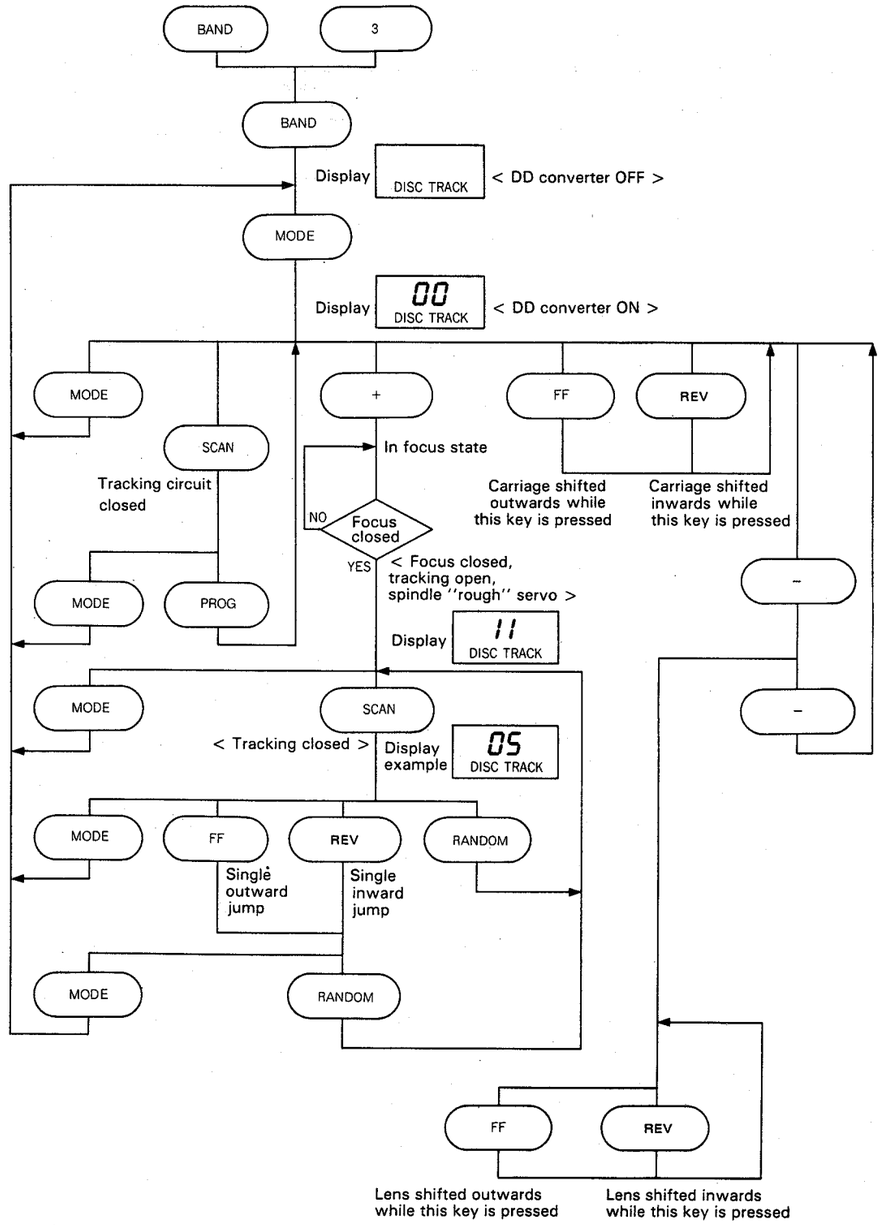


Fig. 7

9.2 AUDIO/TUNER ADJUSTMENT

NOTICE:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of SSG.

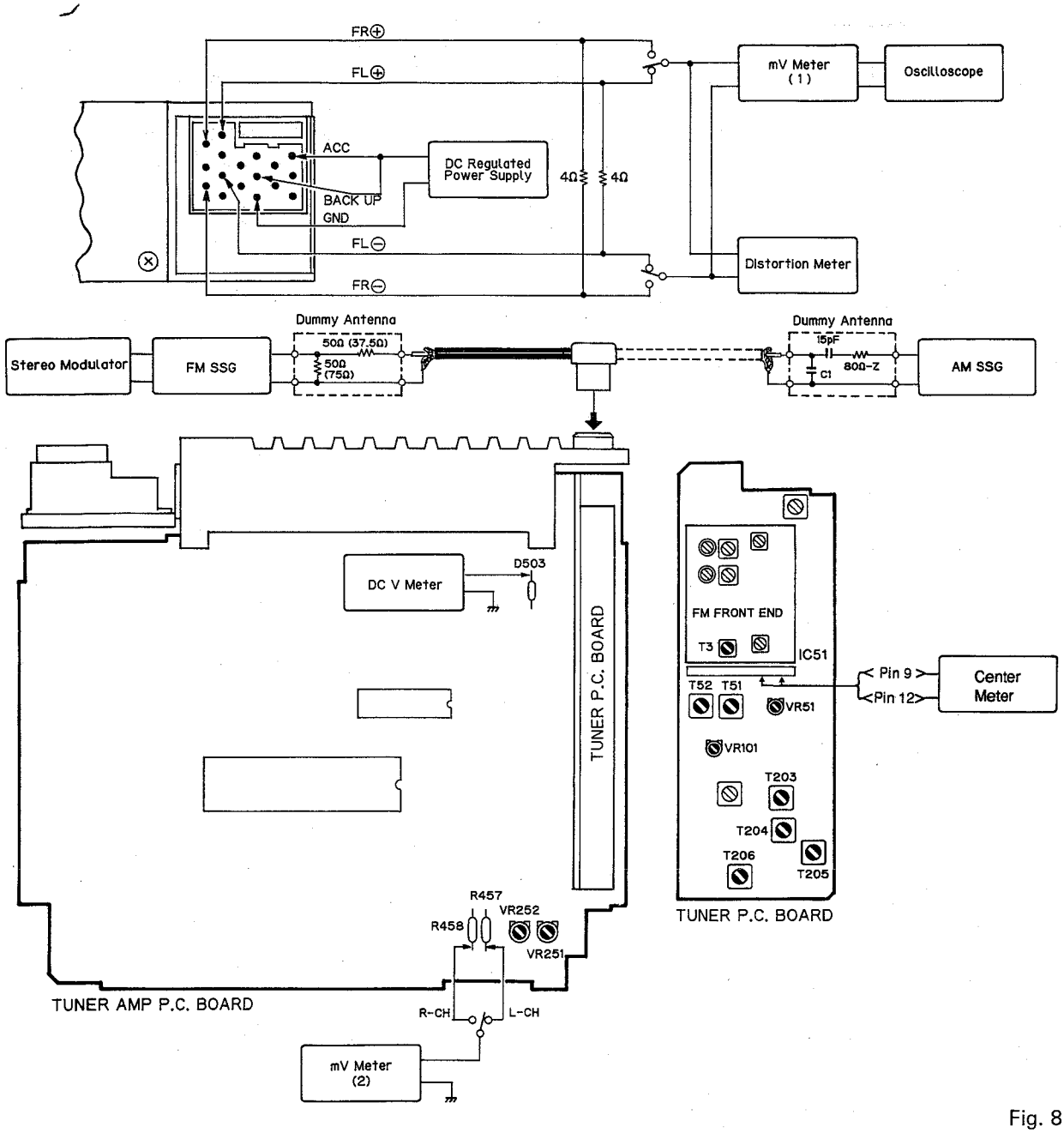


Fig. 8

FM ADJUSTMENT ※ Stereo MOD.: 1kHz, L+R=90% , Pilot=10%

	No.	FM SSG(400Hz, 100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBμV)			
IF	1	98.1 Unmodulated	60	98.1	T51	Center Meter:0
	2	98.1	60	98.1	T52	Distortion Meter:Minimum
Front End	1			87.7	——	Verify that DC V Meter is less than 7.7V.
	2			107.9	——	Verify that DC V Meter is more than 0.8V.
	3	98.1	10	98.1	T3	mV Meter(1):Maximum
MPX	1	※98.1	60	98.1	VR101	mV Meter(1):Separation Maximum
	2	※98.1	35	98.1	VR51	mV Meter(1):Separation 5 dB

AM ADJUSTMENT

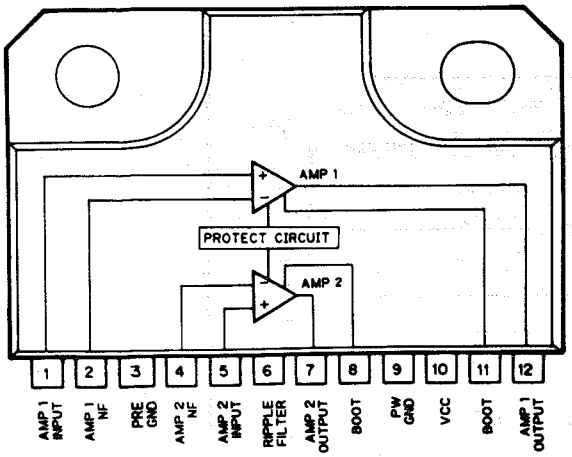
	No.	AM SSG(400Hz, 30%)		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(kHz)	Level(dBμV)			
Tuning Volt	1	1,710	—	1,710	—	DC V Meter:Less than 8.0V
	2	530	—	530	—	DC V Meter:More than 0.8V
Tracking	1	600	20	600	T203, 204, 205, 206	mV Meter(1):Maximum
	2	600 1,000 1,400	35	600 1,000 1,400	—	The differrence between the maximum and minimum output levels at 600kHz. 1,000kHz and 1,400kHz must be 6dB or less.

DOLBY NR ADJUSTMENT

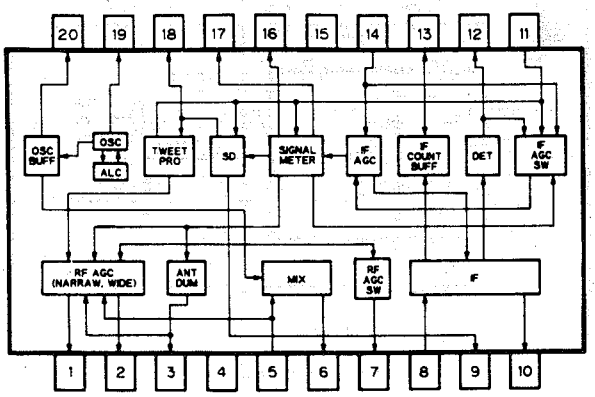
No.	Cassette Tape	Adjusting Point	Adjustment Method (Switch Position)
1	NCT-150(400Hz, 200nwb/m)	VR251(Lch) VR252(Rch)	mV Meter(2):337mV(-7.2dBs) (DOLBY NR Switch:OFF)

• ICs

TA7280P



LA1137NM



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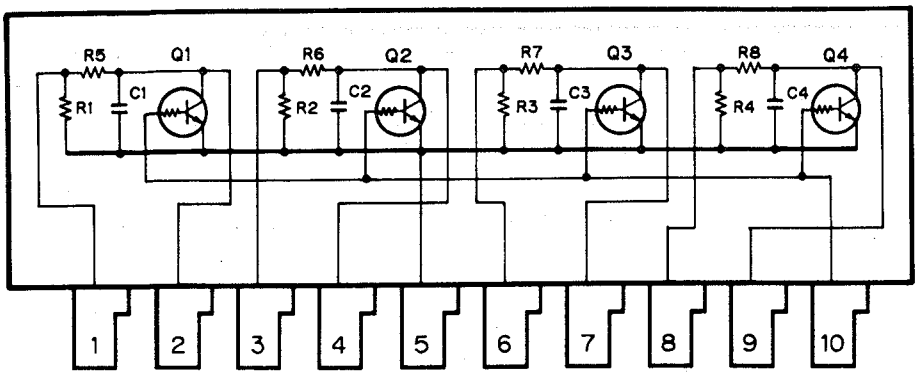
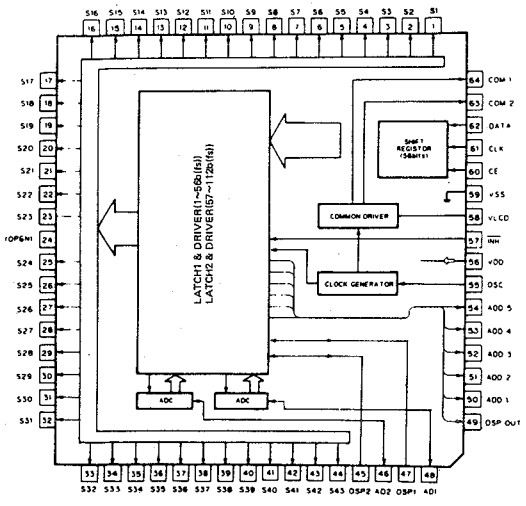
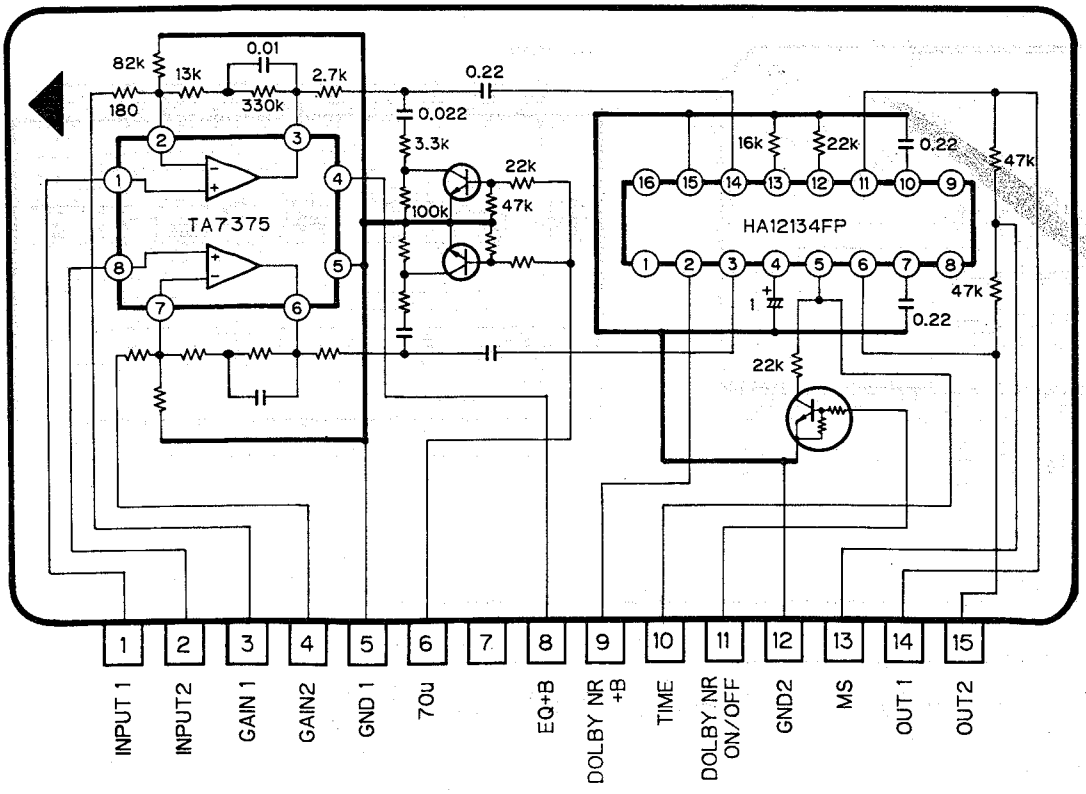


*LC7582A



*IC's marked by * are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

KHA171



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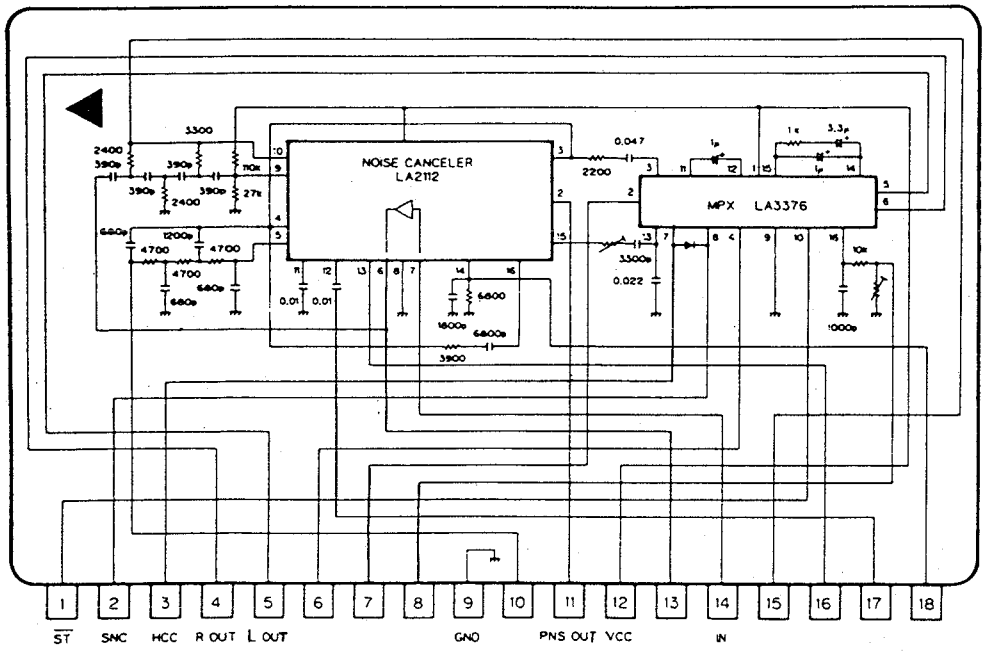

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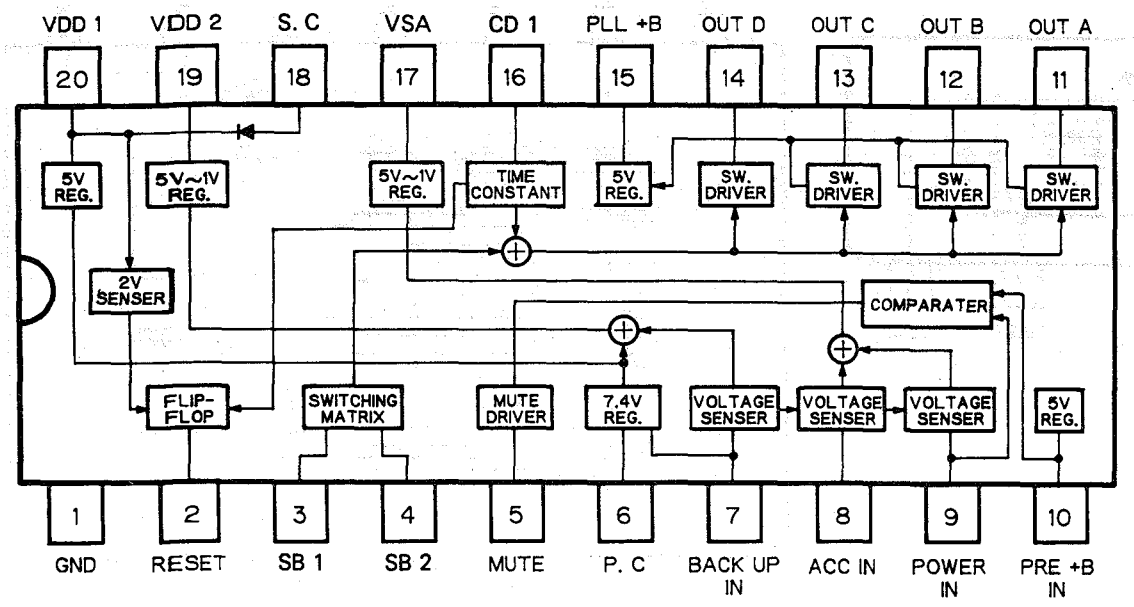

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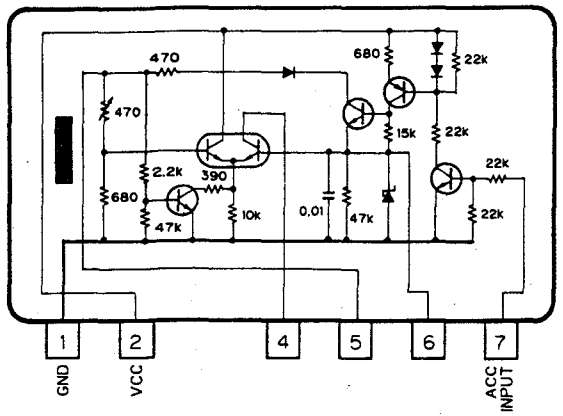

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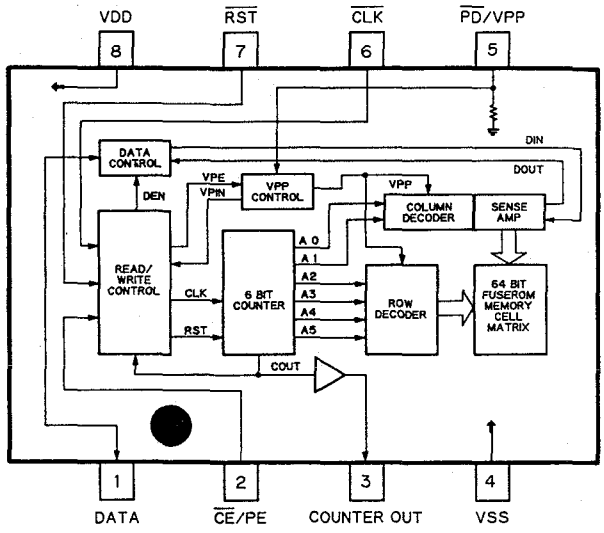
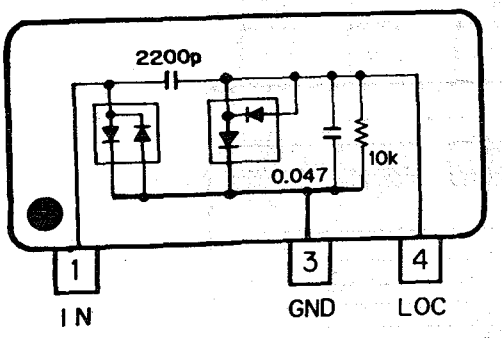
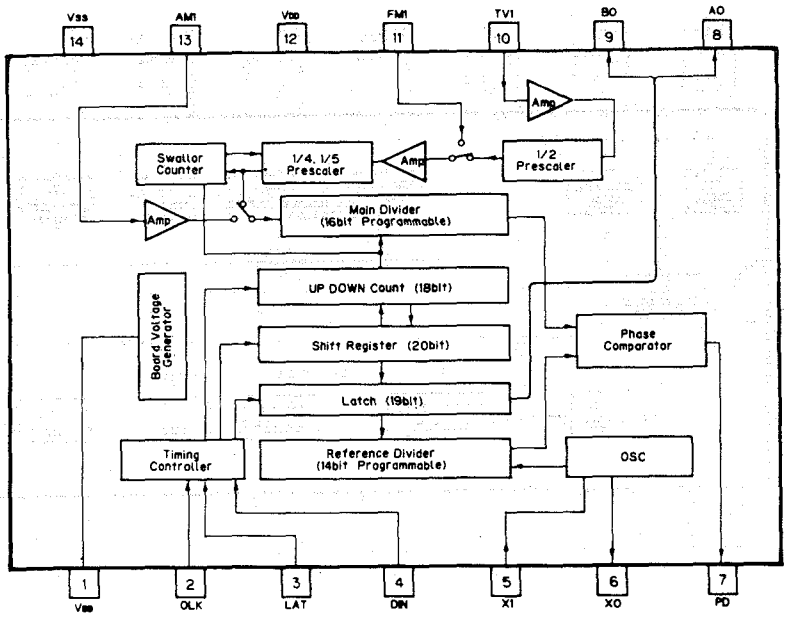


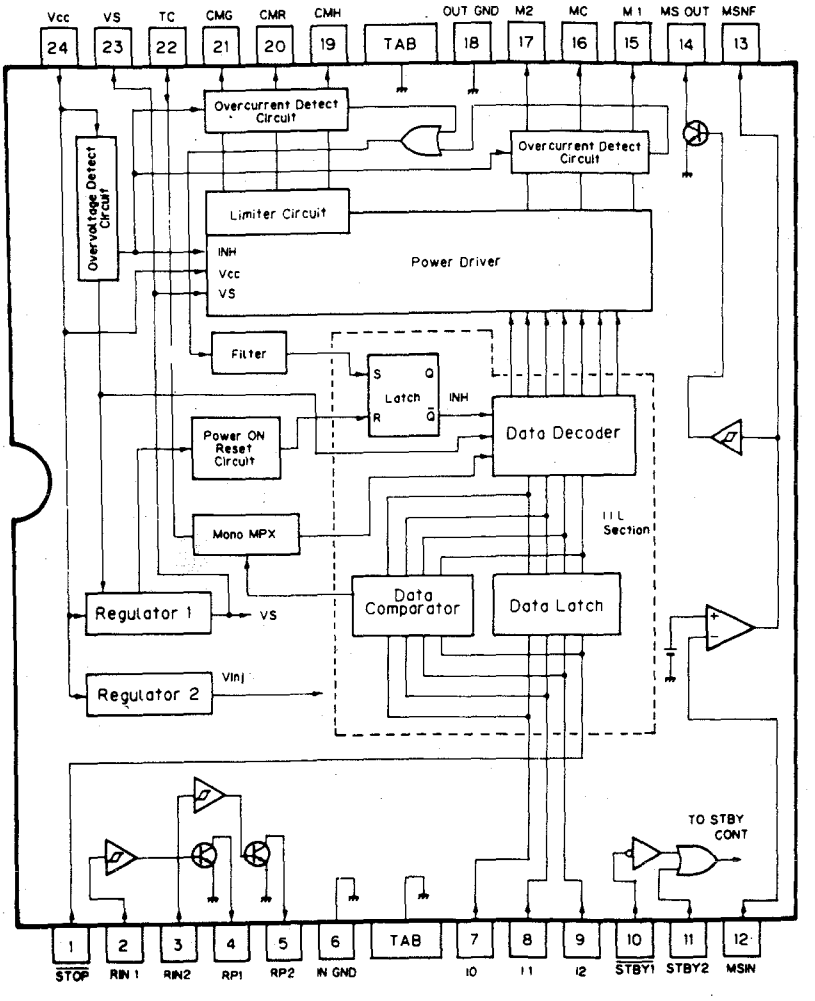
KHA507A



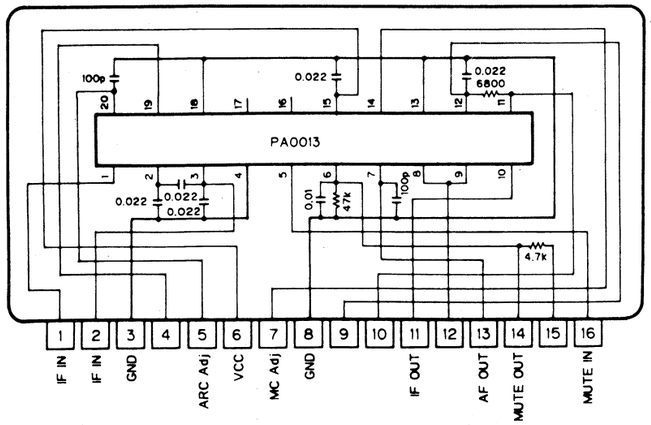
CX-7925B



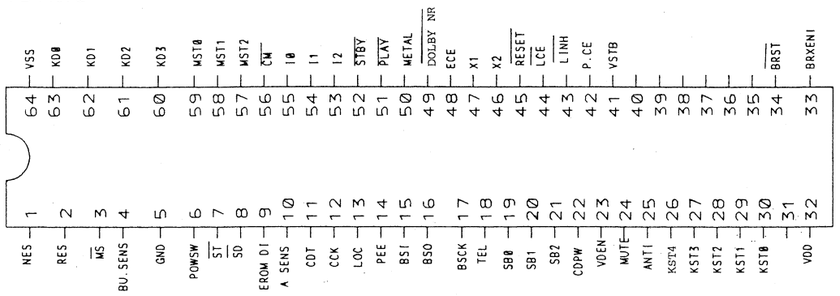
PA3022



KHA141A



*PD4407B



• Pin Functions (PD4407B)

Pin	Pin name	I/O	Output Format	Function
1	NES	input		Normal end detect
2	RES	input		Reverse end detect
3	$\overline{MS}$			Blank detect
4	BU SENS			Back up detect
5	GND			GND
6	POWSW	input		Power detect
7	$\overline{ST}$	input		Stereo
8	$\overline{SD}$	input		SD detect
9	EROM DI			ROM data input
10	ASENS	input		ACC detect
11	CDT	output	C	Common data 1
12	CCK	output	C	Common clock
13	LOC	output	C	Tuner local output
14	PEE			Beep
15	BSI	input		Bus serial input
16	BSO	output	C	Bus serial output
17	BSCK			Bus serial clock
18	TEL	input		Telephone mute
19	SBO	output	NM	Power supply control 0
20	SBI	output	NM	Power supply control 1
21	SB2	output	NM	Power supply control 2
22	CDPW	output	NM	CD power supply control
23	VDEN	output	N	E.VOL data enable
24	MUTE	output	N	Mute output
25	ANTI	output	N	Anti-theft LED
26-30	KST4-0	output	N	Key strobe
31	NC			
32	VDD			
33	BRXEN I	input/ output	C	Bus reception enable
34	$\overline{BRST}$	output	C	Bus reset
35-40	NC			
41	VSTB	output	C	Electronic volume strobe
42	PCE	output	C	PLL IC chip enable
43	$\overline{LINH}$	output	C	LCD driver inhibit
44	$\overline{LCE}$	output	C	LCD driver chip enable
45	$\overline{RESET}$	input		Reset
46,47	X2, X1			
48	ECE	output	C	ROM chip enable
49	$\overline{DOLBY\ NR}$	output	C	Dolby NR ON=L
50	METAL	output	C	70μS=H
51	$\overline{PLAY}$	output	C	Play
52	$\overline{STBY}$	output	C	PA3022 stand-by
53-55	I2-I0	output	C	PA3022 data
56	CM	output	C	Capstan motor
57-59	MST2-0	output	C	Mechanism switch strobe
60-63	KD3-0	input		Key , mechanism switch input
64	vss			

Output Format	Meaning
C	C-MOS
N	N channel open drain
NM	Middle resistivity N channel open drain

KHA2

• FM

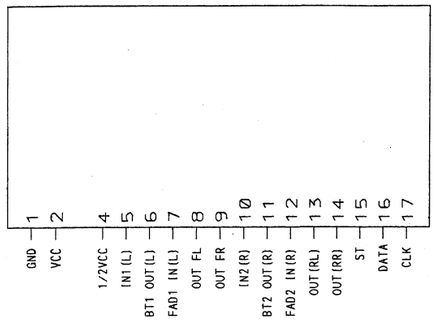
ANT

GND

LOCL

LOCH

KHA281



• FM Front End (CWB1059)

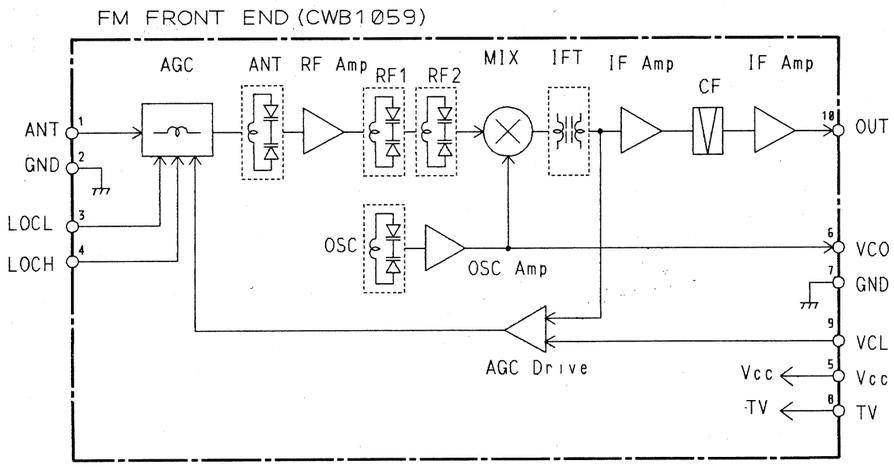
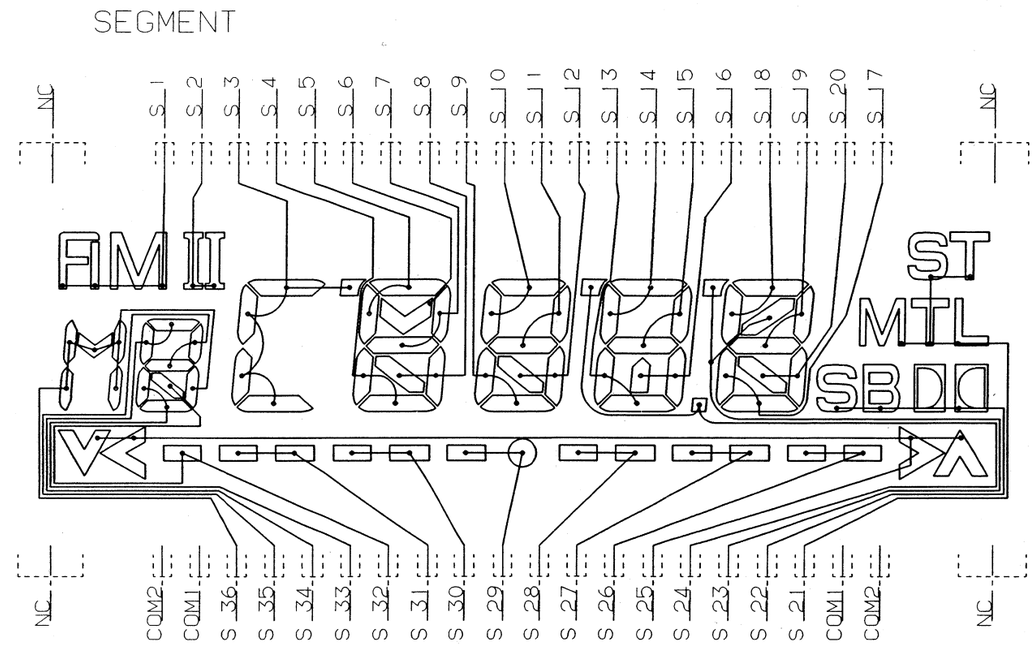


Fig. 9

• LCD (CAW1183)



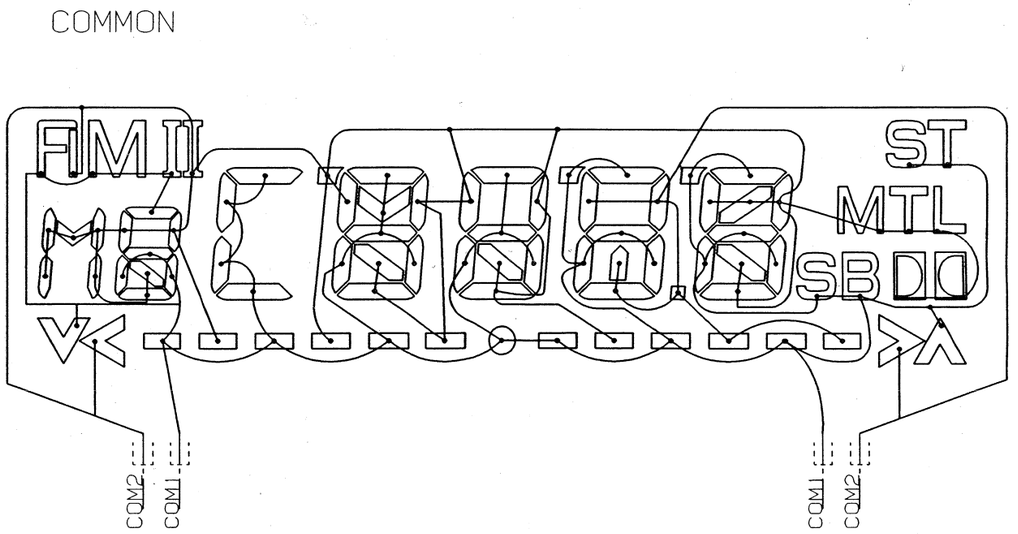
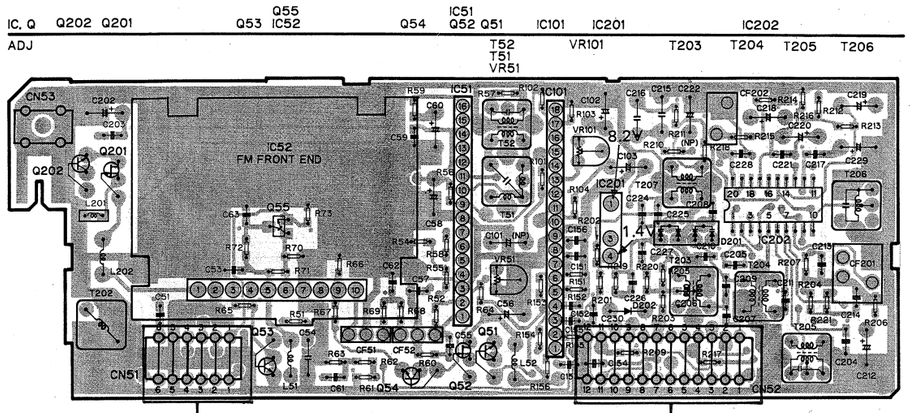


Fig. 10

10. CONNECTION DIAGRAM

TUNER P. C. BOARD



TUNER P.C. BOARD :IC51

1	2	3	4
2.1V	2.1V	0V	0.4V
5	6	7	8
0.4V	0.1V	1.1V	0V
9	10	11	12
4.7V	4.7V	4.7V	4.7V
13	14	15	16
4.7V			

TUNER P.C. BOARD: IC202

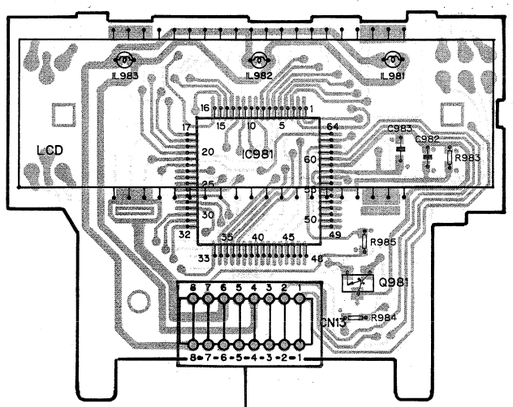
1	2	3	4	5	6	7	8	9	10
2.3V	1.4V	1.1V	0V	2.1V	8.3V	6.2V	1.5V	1.7V	8.3V
11	12	13	14	15	16	17	18	19	20
7.0V	3.8V	8.1V	3.9V	8.3V	2.7V	8.2V	4.9V	8.3V	5.0V

TUNER P.C. BOARD: IC101

1	2	3	4	5	6	7	8	9
7.8V	1.2V	1.6V	3.0V	3.0V	2.6V	3.2V	0.8V	0V
10	11	12	13	14	15	16	17	18
4.3V	3.5V	7.8V	4.3V	4.9V	2.8V			

LCD UNIT

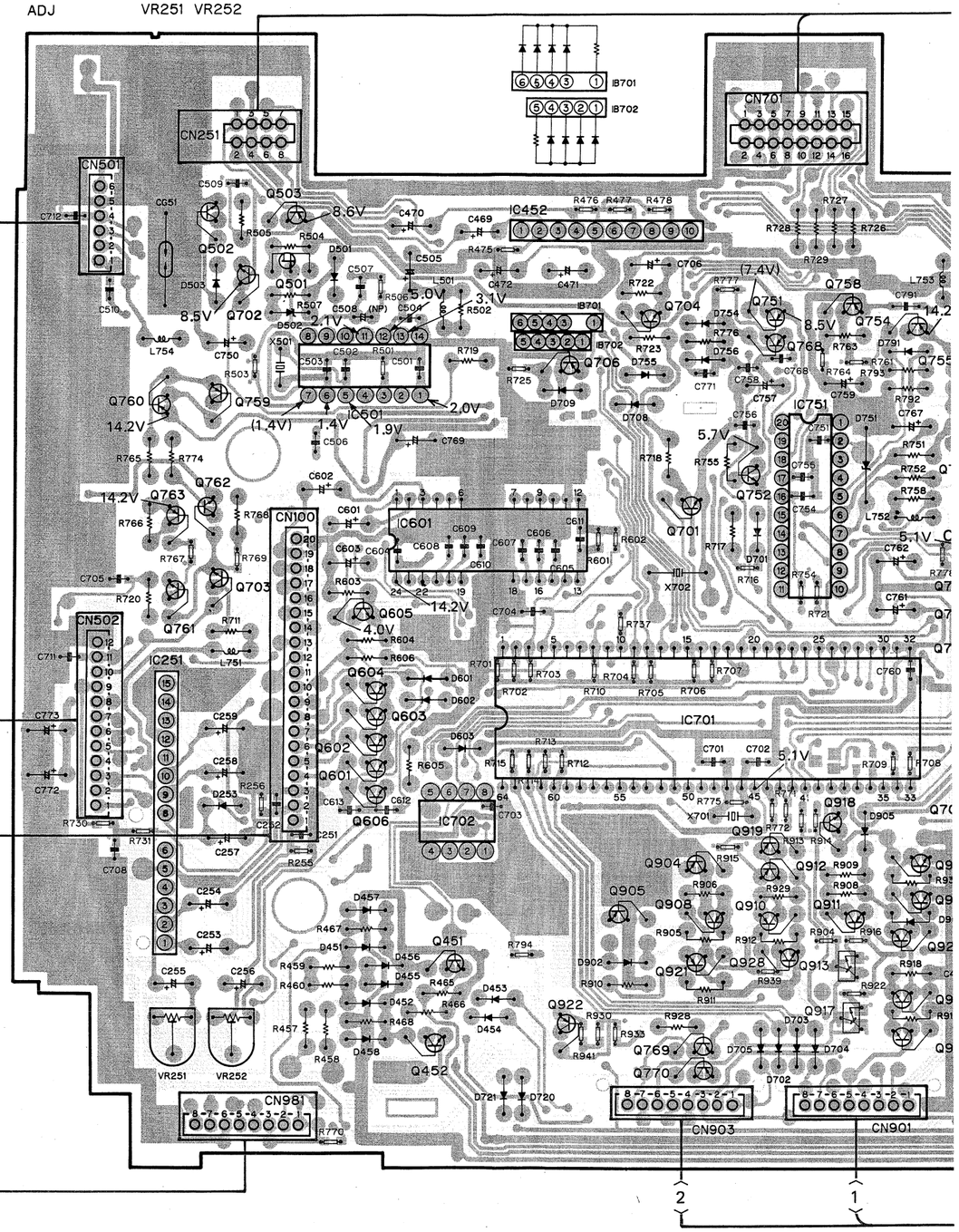
IC. Q IC981 Q981



TUNER AMP P. C. BOARD

IC. Q Q760 Q502 Q763 Q759 Q761 Q762 Q503 IC501 Q604 Q603 Q602 Q601 Q605 Q606 IC601 IC702 Q451 Q452 IC452 Q706 Q922 Q704 Q905 Q904 Q908 Q921 IC751 Q751 Q758 Q919 Q912 Q918 Q911 Q754 Q927 Q926 Q925 Q915 Q914 Q769 Q768 Q910 Q913 IC701 Q770 Q752 Q928 Q917

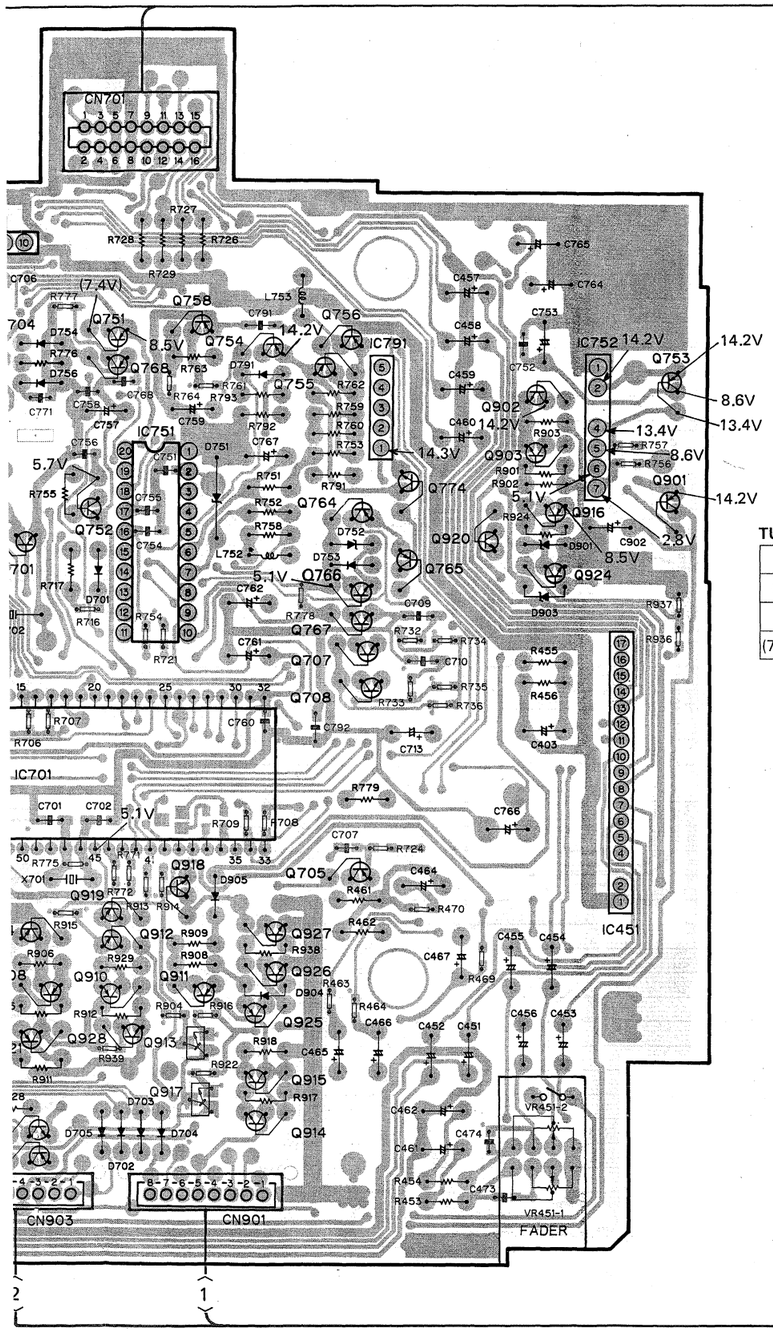
ADJ VR251 VR252



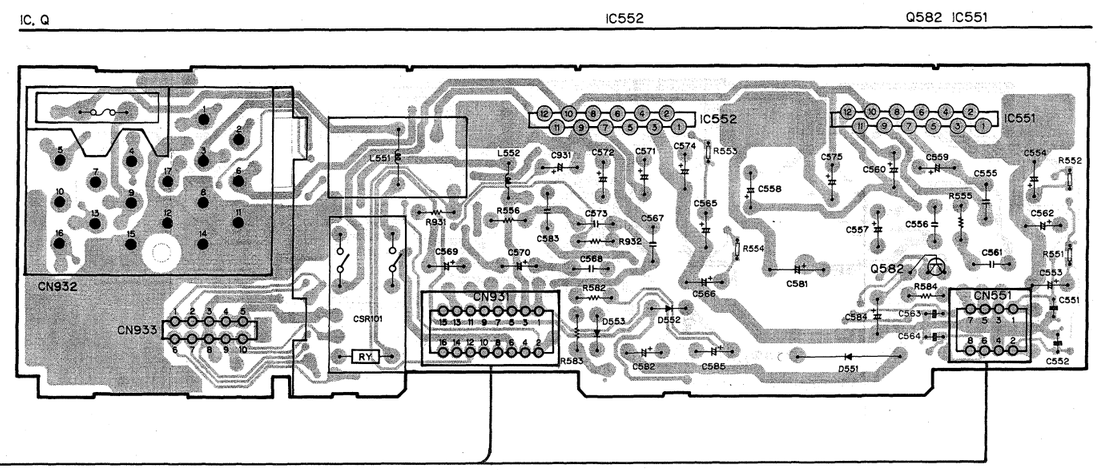
TUNER AMP P.C. BOARD: IC251

1	2	3	4	5	6	7	8
1.3V	1.3V	0.8V	0.8V	0.4V	4.5V		7.9V
9	10	11	12	13	14	15	
8.5V	0.4V	5.1V	0.5V	4.0V	4.1V	4.1V	

				Q754		IC791				
	Q904		IC751	Q758	Q927		Q764			
	Q908		Q919	Q918	Q926		Q766		Q902	
	Q921	Q751	Q912	Q911	Q925	Q756	Q767		Q903	
Q701	Q769	Q768	Q910	Q913	Q915	Q755	Q707	Q774	Q916	IC752 Q753
C701	Q770	Q752	Q928	Q917	Q914	Q705	Q708	Q765 Q920	Q924	IC451 Q901



AMP P. C. BOARD



TUNER AMP P.C. BOARD: IC751

1	2	3	4	5	6	7	8	9	10
0V	5.1V			0V	8.9V	13.3V	14.3V	14.3V	
11	12	13	14	15	16	17	18	19	20
(7.4V)	(8.2V)		(8.2V)	5.1V	4.0V	5.1V	5.1V	5.7V	5.1V

TUNER AMP P.C. BOARD: IC451

1	2	3	4	5	6	7	8	9
0V	8.6V		4.3V	4.3V	4.3V	4.3V	4.3V	4.3V
10	11	12	13	14	15	16	17	
4.3V	0V	8.6V	8.6V					

AMP P.C. BOARD :IC551.552

1	2	3	4
1.5V	1.5V	0V	1.5V
5	6	7	8
1.5V	6V	7.1V	13.4V
9	10	11	12
0V	14.2V	13.4V	7.1V

KEY BOARD UNIT

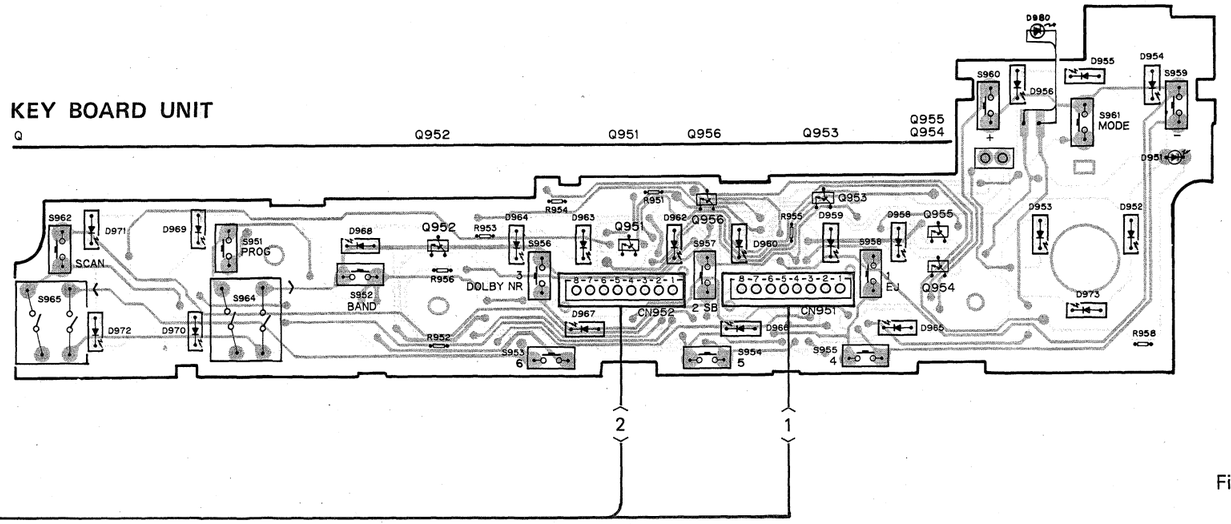
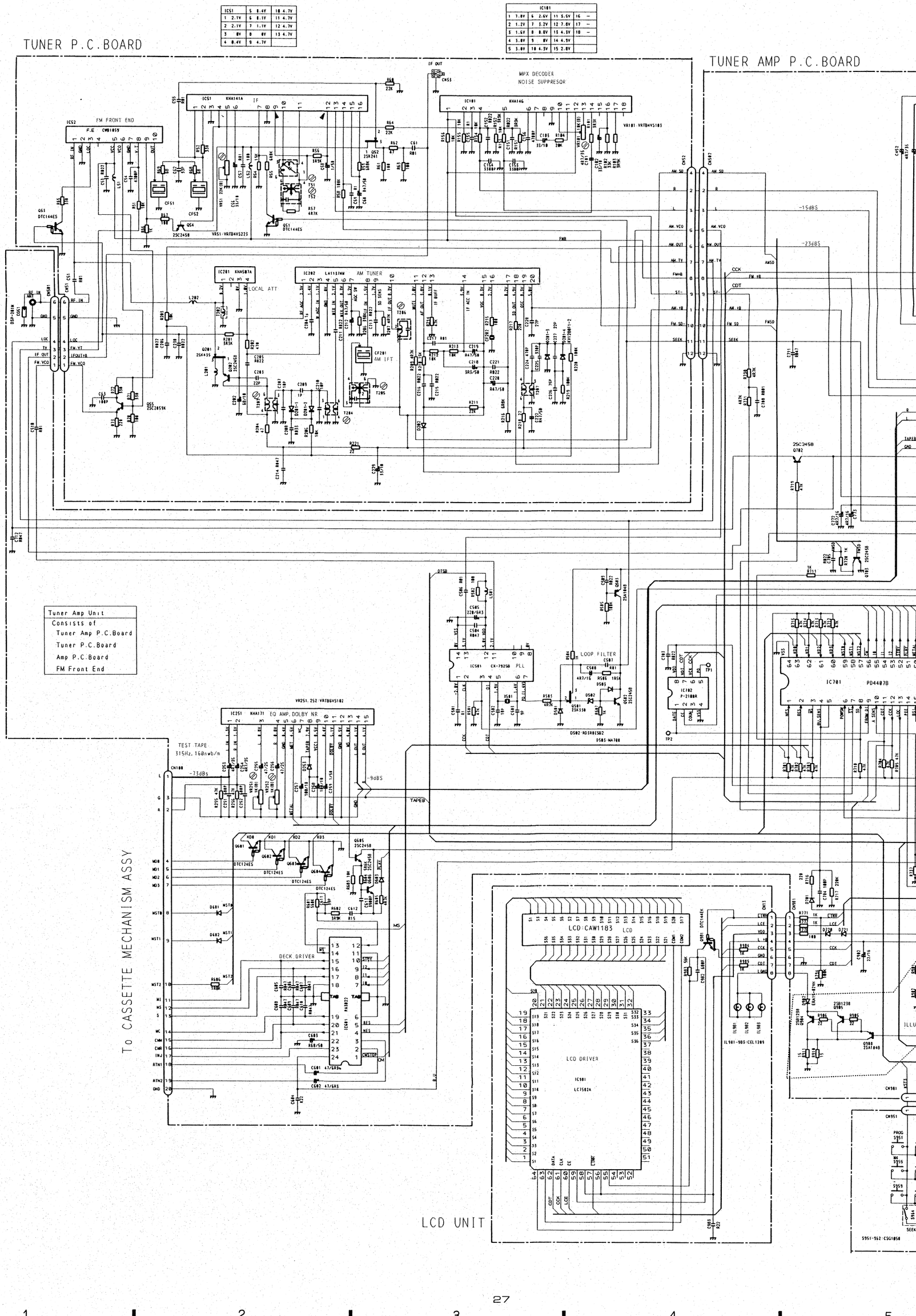


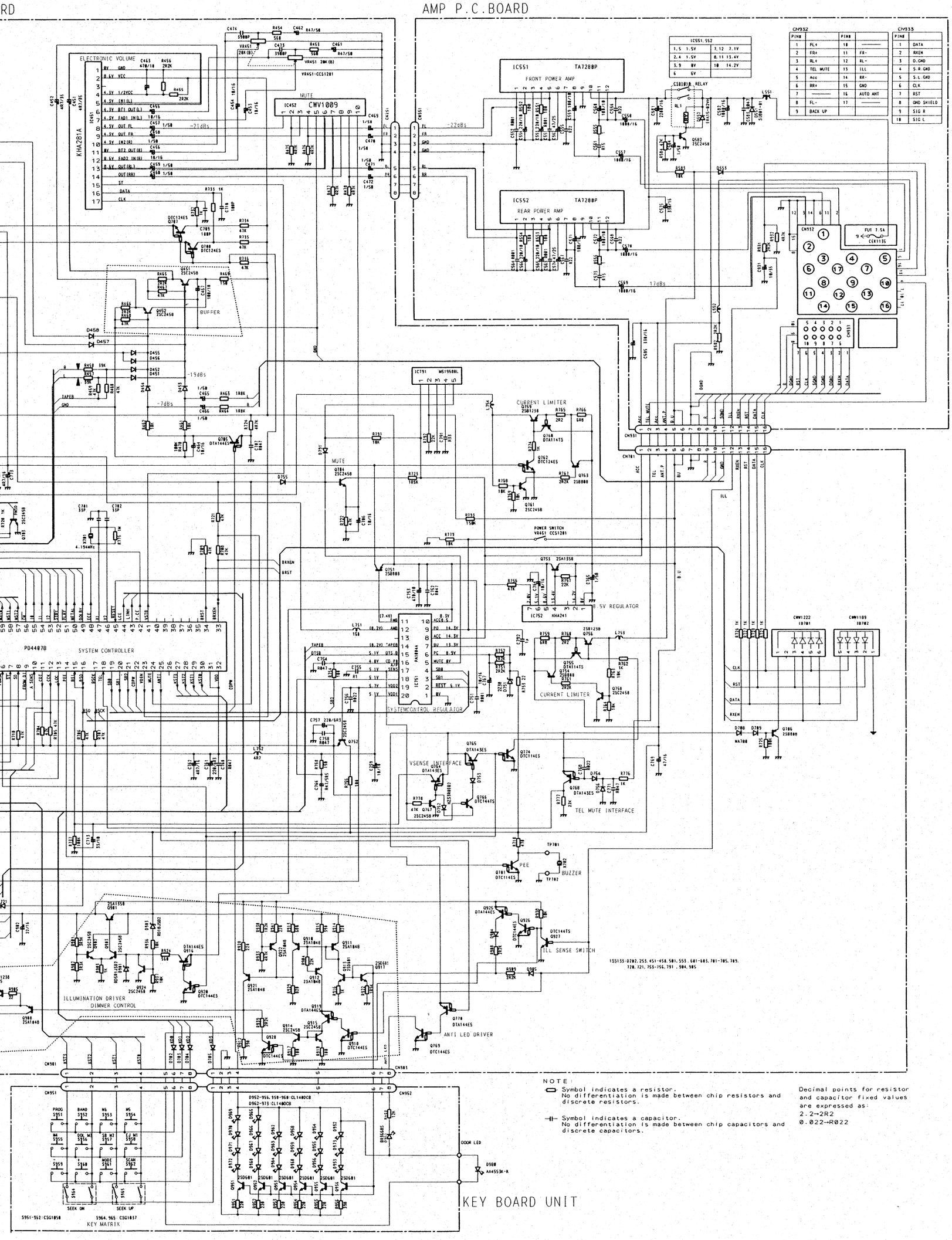
Fig. 11

11. SCHEMATIC CIRCUIT DIAGRAM



RD

AMP P.C.BOARD



NOTE:

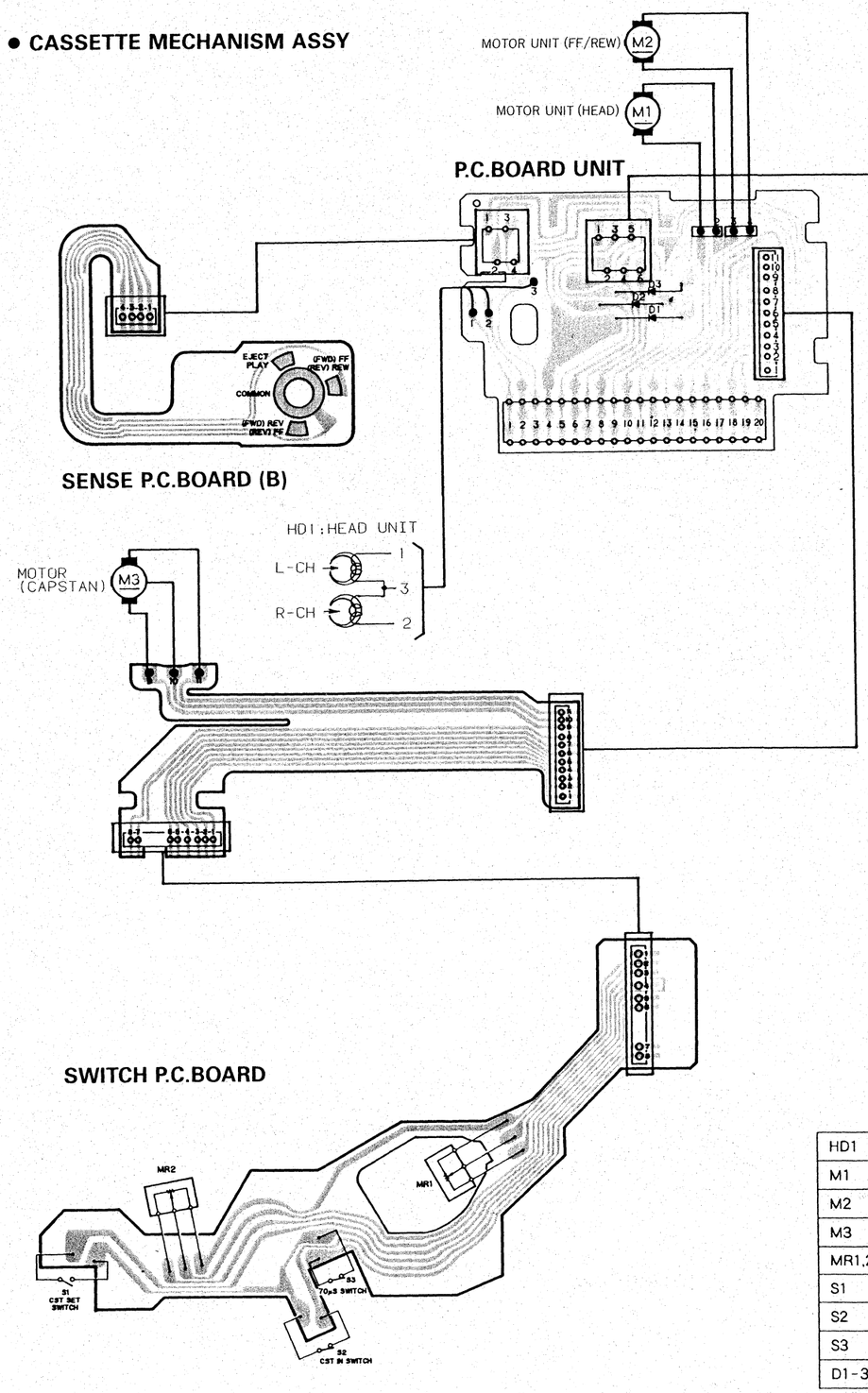
- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

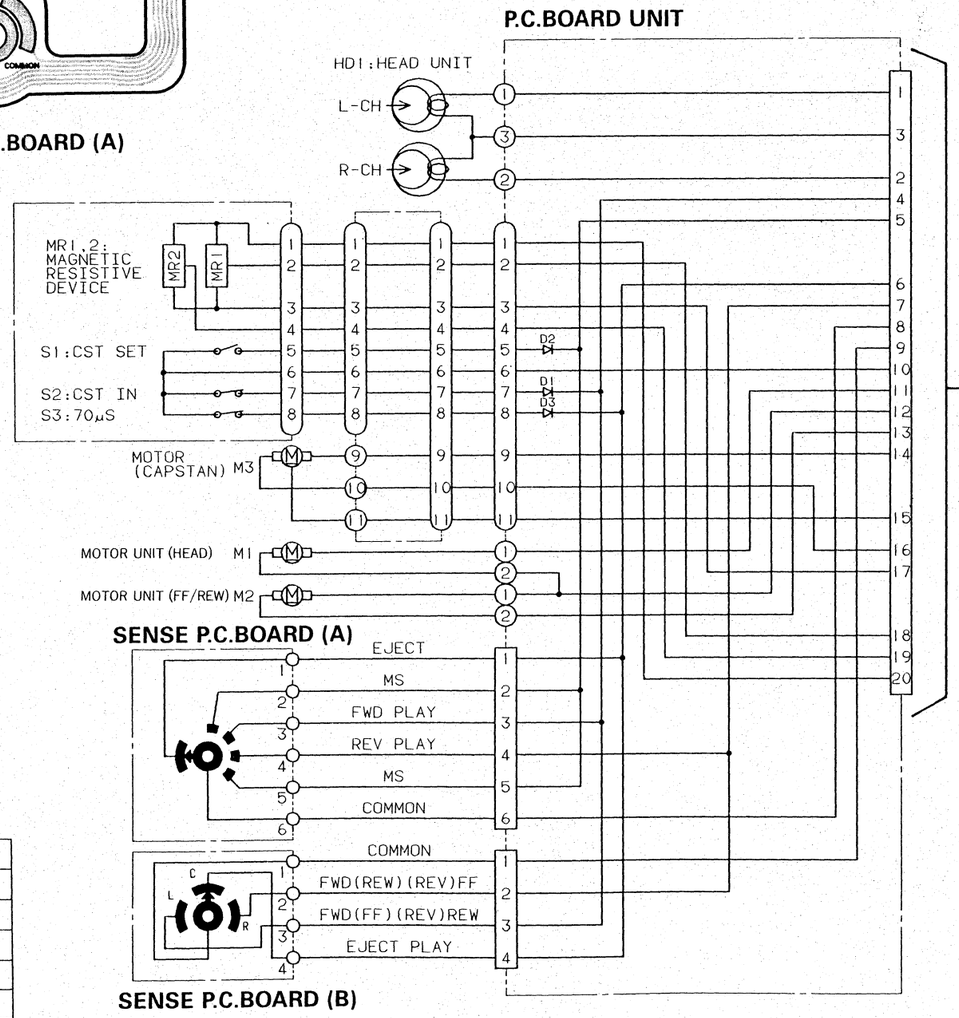
Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

Fig. 12

12. CIRCUIT DIAGRAM AND P.C. BOARD PATTERN

• CASSETTE MECHANISM ASSY





HD1	CXA3551
M1	CXA3596
M2	CXA3596
M3	CXM1055
MR1,2	DM-106B
S1	CSN-089
S2	CSN1003
S3	CSN1003
D1-3	1S1555

Fig. 13

13. CHASS

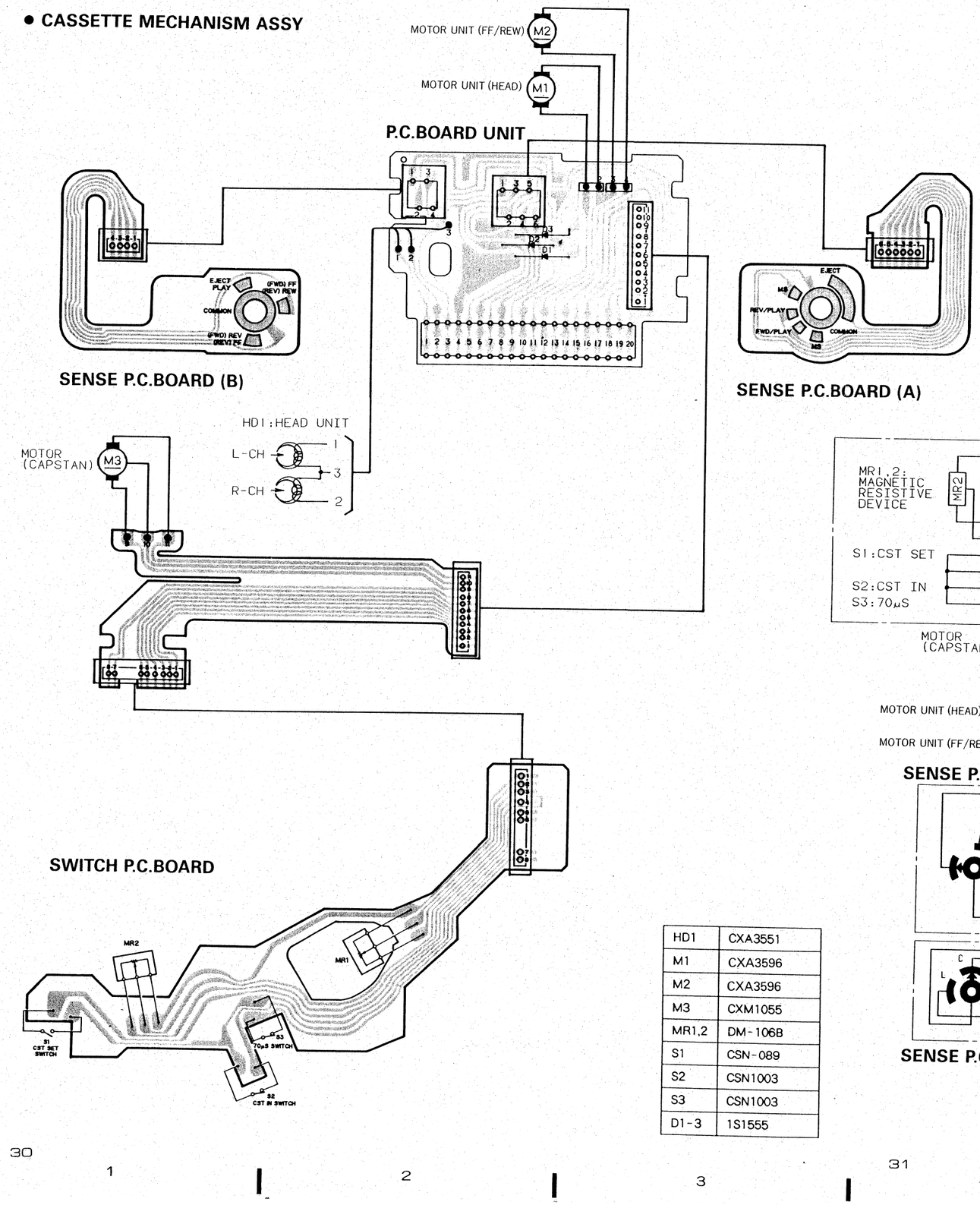
NOTES:
- *Parts marked by*
- *Parts marked by*

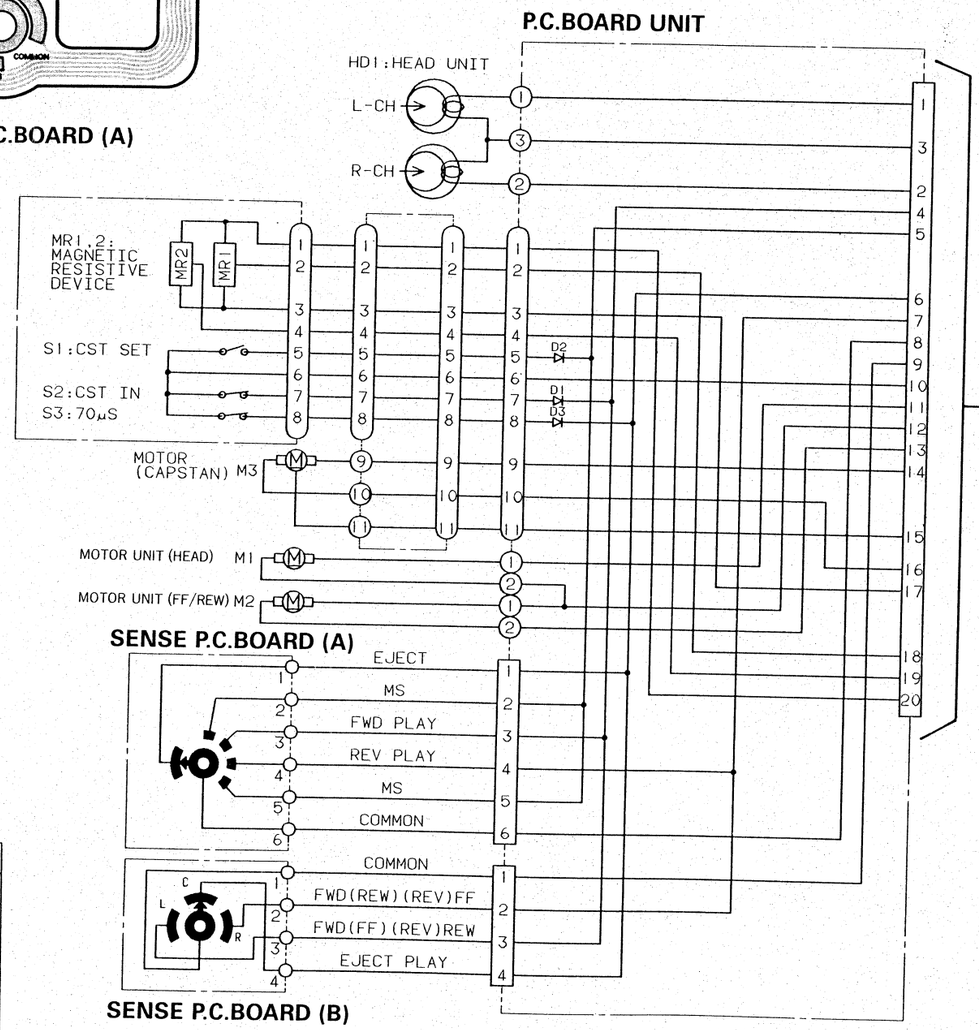
• Parts List

Mark No.	Descripti
	1 Knob
*	2 Case Unit
	3 Screw
◉	4 Cassette Assy
	5 Holder
	6 LED(D951)
	7 Spacer
	8 P.C.Board
	9 LED(D980)
	10 Lens
	11 Spring
	12 Door
	13 Button(MOI
	14 Button(-)
	15 Button(+)
	16 Grille Uni
	Grille Uni
	17 Button(BAN
	18 Button(PRC
	19 Button(1 E
	20 Button(2 S
	21 Button(3 D
	22 Button(4)
	23 Button(5)
	24 Button(6)
*	25 Cover
	26 Button(< >
	27 Screw
	28 Screw
	29 Plug
	30 Holder
*	31 Earth
◉	32 Key Board
	33 Holder
	34 Sheet
	35 LCD
*	36 Case
	37 Volume(VR4
	38 Holder
	39 Spacer
	40 Lamp(IL981
	41 Holder
	42 Connector
	43 Connector
◉	44 LCD Unit

12. CIRCUIT DIAGRAM AND P.C. BOARD PATTERN

• CASSETTE MECHANISM ASSY





HD1	CXA3551
M1	CXA3596
M2	CXA3596
M3	CXM1055
MR1,2	DM-106B
S1	CSN-089
S2	CSN1003
S3	CSN1003
D1-3	1S1555

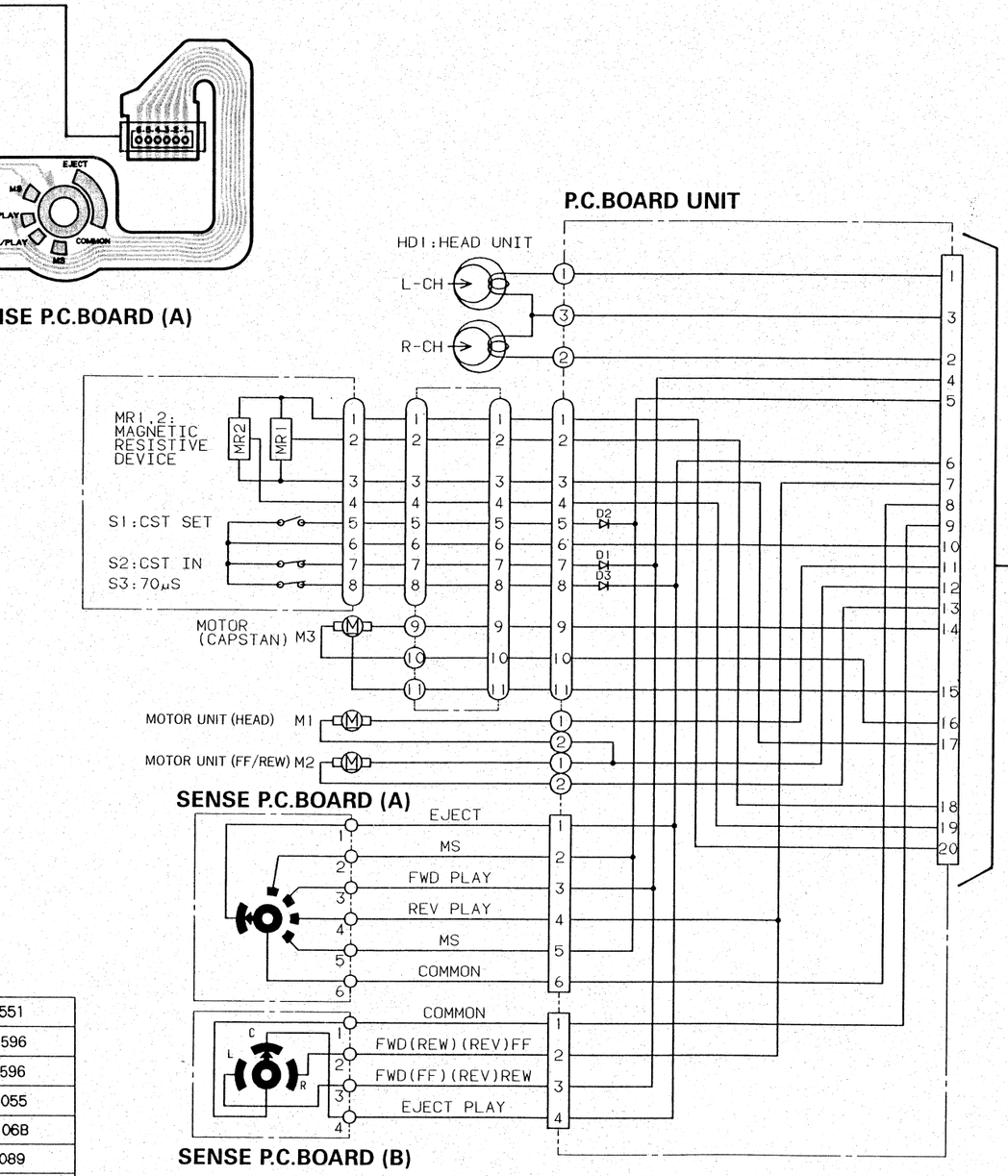
Fig. 13

13. CHASS

NOTES:
- *Parts marked by*
- *Parts marked by*

• Parts List

Mark	No.	Descripti
	1	Knob
*	2	Case Unit
	3	Screw
◉	4	Cassette Assy
	5	Holder
	6	LED(D951)
	7	Spacer
	8	P.C.Board
	9	LED(D980)
	10	Lens
	11	Spring
	12	Door
	13	Button(MOI
	14	Button(-)
	15	Button(+)
	16	Grille Uni
		Grille Uni
	17	Button(BAN
	18	Button(PRC
	19	Button(1 E
	20	Button(2 S
	21	Button(3 D
	22	Button(4)
	23	Button(5)
	24	Button(6)
*	25	Cover
	26	Button(< >
	27	Screw
	28	Screw
	29	Plug
	30	Holder
*	31	Earth
◉	32	Key Board
	33	Holder
	34	Sheet
	35	LCD
*	36	Case
	37	Volume(VR4
	38	Holder
	39	Spacer
	40	Lamp(IL981
	41	Holder
	42	Connector
	43	Connector
◉	44	LCD Unit



551
596
596
055
06B
089
003
003
55

Fig. 13

13. CHASSIS EXPLODED VIEW

NOTES:
- *Parts marked by "✱" or "✱" are generally unavailable because they are not in our Master Spare Parts List.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

• Parts List

Mark	No.	Description	Part No.
	1	Knob	CAA1198
*	2	Case Unit	CXA4727
	3	Screw	BMZ26P050FMC
◉	4	Cassette Mechanism Assy	CXK1678
	5	Holder	CNV3145
	6	LED(D951)	BR3668S
	7	Spacer	CNM3374
	8	P.C.Board	CNP2194
	9	LED(D980)	AA4553K-R
	10	Lens	CNS1996
	11	Spring	CBH1362
	12	Door	CAT1401
	13	Button(MODE)	CAC3249
	14	Button(-)	CAC3251
	15	Button(+)	CAC3250
	16	Grille Unit(US)	CXA4701
		Grille Unit(×1H)	CXA5339
	17	Button(BAND)	CAC3299
	18	Button(PROG,SCAN)	CAC3300
	19	Button(1 EJ)	CAC3293
	20	Button(2 SB)	CAC3294
	21	Button(3 DOLBY NR)	CAC3295
	22	Button(4)	CAC3296
	23	Button(5)	CAC3297
	24	Button(6)	CAC3298
*	25	Cover	CNM2758
	26	Button(< >)	CAC3301
	27	Screw	BMZ30P060FMC
	28	Screw	BPZ26P080FMC
	29	Plug	CKS1659
	30	Holder	CNV3146
*	31	Earth	CNC4285
◉	32	Key Board Unit	CWM2988
	33	Holder	CNV2946
	34	Sheet	CNM3364
	35	LCD	CAW1183
*	36	Case	CNC3492
	37	Volume(VR451)	CCS1201
	38	Holder	CNC3737
	39	Spacer	CNM-903
	40	Lamp(IL981-913)	CEL1209
	41	Holder	CNV2897
	42	Connector	CKS-666
	43	Connector	CNV2920
◉	44	LCD Unit	CWM2989
	45	Transistor(Q753,901)	2SA1358
	46	Plug	CKS1653
*	47	Cushion	CNM3213
*	48	Holder	CNC4253
	49	Plug	CKS-647
*	50	Holder	CNC4251
*	51	Heat Sink	CNG-368
	52	Connector	CKS1853
	53	Connector	CKS1849
	54	Plug	CKS-645
	55	Plug	CKS-651
*	56	Earth	CNC4252
	57	Clamper	CNV1335
*	58	Insulator	CNM3354
	59	Chassis Assy	CXA4700
*	60	Holder	CNC4250
	61	Connector	CKS-749
	62	Connector	CKS-745
	63	Antenna Jack	CKX1018
	64	Frame Unit	CXA4726
	65	Plug	CKS-659
◉	66	Tuner Amp Unit	CWM2987
	67	Cover	CNV2896
	68	Fuse(FU1)	CEK1135
	69	Connector	CKM1086
	70	Connector	CKM1085
*	71	Holder	CNC4307
	72	Connector	CKX1012
*	73	Holder	CNC4308
	74	FM Front End	CWB1059
	75	Connector	CKS-664
	76	Connector	CKS-670
◉	77	Tuner Amp Assy	CWM2986
	78	Bolt	CBA1115
	79	Spacer	CNM1429
	80	Earth	CNC4553
	81	Heat Sink	CNR1248
		Owner's Manual (English)	CRB1250
		Installation Manual	CRB1251
		Label	CRW1127
		Card(×2)	CRY1003

• **Chassis**

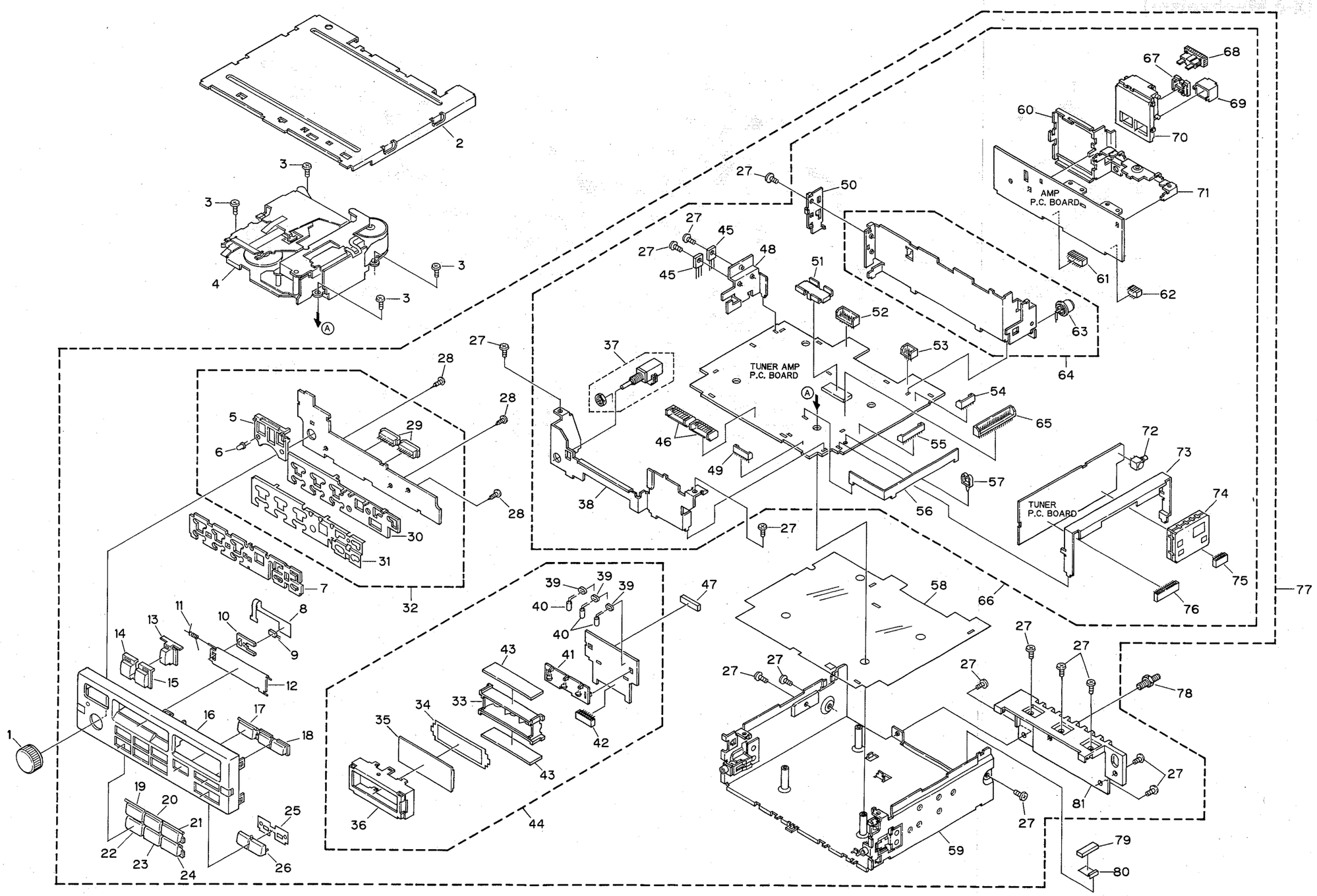


Fig. 14

14. CASSETTE MECHANISM EXPLODED VIEW
(X-0 Mechanism)

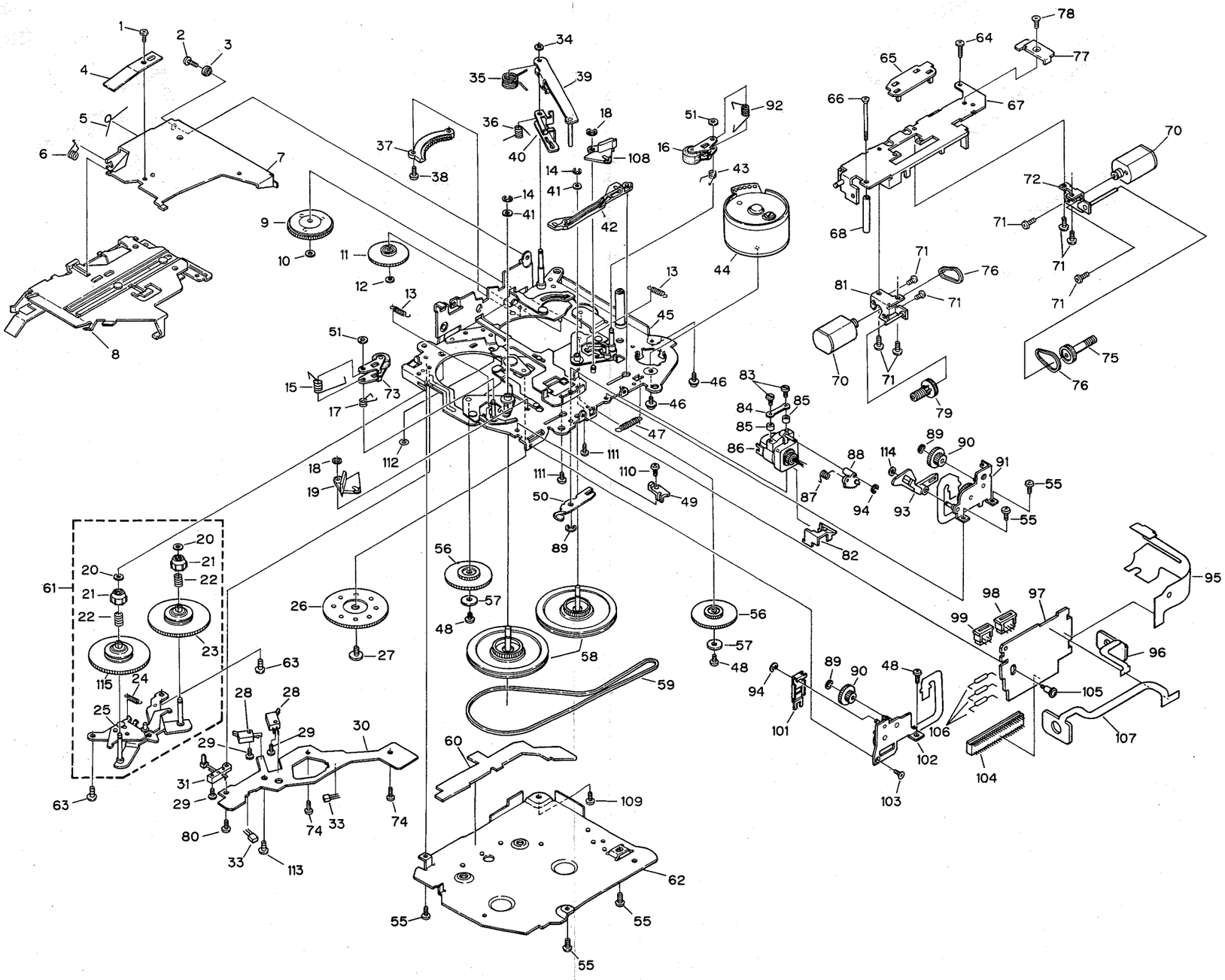


Fig. 15

• Parts List

Mark	No.	Description	Part No.
	1	Screw(M1.4×1.4)	HBA-147
	2	Screw	BMZ20P040FMC
	3	Bush	CLB-663
	4	Spring	CBE1023
	5	Spring	CBH-867
	6	Spring	CBH-837
	7	Arm	CNC2373
	8	Holder Unit	CXA4527
	9	Gear Unit	CXA4022
	10	Washer	CBF1026
	11	Gear	CNY-271
	12	Washer	CBF-126
	13	Spring	CBH-835
	14	E Type Washer	CBG1003
	15	Spring	CBH1277
	16	Pinch Roller Unit	CXA2608
	17	Spring	CBH1197
	18	E Type Washer	YE25FUC
	19	Arm	CNV1254
	20	Washer	CBF1022
	21	Collar	CNW-932
	22	Spring	CBH-827
	23	Reel Unit	CXA4023
	24	Spring	CBH-868
	25	Bracket Unit	CXA1481
	26	Gear	CNW-944
	27	Screw(M2×4)	CBA1106
	28	Switch(70μS,CST IN)	CSN1003
	29	Screw(M1.7×5.5)	CBA1025
	30	P.C.Board	CNP1223
	31	Switch(CST SET)	CSN-089
	32	·····	
	33	Magnetic Resistive	DM-106B
	34	Washer	CBF-046
	35	Spring	CBH1270
	36	Spring	CBH-886
	37	Gear	CNV1075
	38	·····	
	39	Arm Unit	CXD2859
	40	Arm	CNG-618
	41	Washer	HBF-179
	42	Lever	CNV1257
	43	Spring	CBH1196
	44	Motor(Capstan)	CXM1055
	45	Chassis Unit	CXA3544
	46	Screw	PMS26P025FMC
	47	Spring	CBH-830
	48	Screw(M2×2.5)	HBA-175
	49	Spacer	CNW-945
	50	Spring	CBL1050
	51	Washer	CBF1025
	52	·····	
	53	Spring	CBL-893
	54	Collar	CLA1110
	55	Screw	BMZ20P025FMC
	56	Gear	CNV1616
	57	Collar	CLA1238
	58	Flywheel	CNR1572
	59	Belt	CNT1046
	60	Insulator	CNM2592
	61	Reel Assy	CXA4025
	62	Cover	CNC2829
	63	Screw	BMZ20P030FMC
	64	Screw(M1.7×6)	CBA1125
	65	Holder	CNV1252
	66	Screw(M2×25)	CBA-165
	67	Guide	CNC2219
	68	Spacer	CNC1651
	69	·····	
	70	Motor (FF/REW,Head Position)	CXA3596
	71	Screw(M2×2.2)	HBA-174
	72	Bracket Unit	CXA2605
	73	Pinch Roller Unit	CXA2609
	74	Screw(M2×2.5)	CBA1037
	75	Pulley	CNV1255
	76	Belt	CNT1030
	77	Plate	CNC3632
	78	Screw(M2×2.2)	HBA-212
	79	Pulley	CNV1256
	80	Screw(M2×5)	CBA1054
	81	Bracket Unit	CXA1381
	82	Cover	CNV1489
	83	Screw(M1.4×8)	CBA1169
	84	Spring	CBE-114
	85	Azimuth Rubber	CNY-134
	86	Head Unit	CXA3551
	87	Spring	CBH-829
	88	Gear	CNW-939
	89	E Type Washer	YE12FUC
	90	Gear	CNV1262
	91	Holder Assy	CXA1546
	92	Spring	CBH1276
	93	Arm	CNV1495
	94	E Type Washer	YE15FUC
	95	P.C.Board	CNP1227
	96	P.C.Board	CNP1738
	97	P.C.Board	CNP2747
	98	Connector(6P)	CKS1075
	99	Connector(4P)	CKS1073
	100	·····	
	101	Arm	CNH-004
	102	Holder Assy	CXA1548
	103	Screw(M2×2)	HBA-209
	104	Connector(20P)	CKS-678
	105	Screw(M2×2×3)	CBA1022
	106	Diode	1S1555
	107	P.C.Board	CNP2110
	108	Arm	CNV1253
	109	Screw(M2×6)	CBA1004
	110	Screw(M2×4)	CBA1015
	111	Screw(M2×2.5)	CBA1041
	112	Washer	CBE-112
	113	Screw(M1.7×3)	CBA-186
	114	Washer	CBF1022
	115	Reel Unit	CXA4024

15. ELECTRICAL PARTS LIST

NOTE:

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*

Chip Resistor

RS1/□S□□□J,RS1/□□S□□□J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

Unit Number :
Unit Name : Tuner Amp Unit

Tuner Amp Unit
Consists of
Tuner Amp P.C.Board
Tuner P.C.Board
Amp P.C.Board
FM Front End

MISCELLANEOUS

Circuit Symbol & No.	Part Name	Part No.
IC 51		KHA141A
IC 101		KHA146
IC 201		KHA507A
IC 202		LA1137NM
IC 251		KHA171
IC 451		KHA281A
IC 452		CWV1009
IC 501		CX-7925B
IC 551 552		TA7280P
IC 601		PA3022
IC 701		PD4407B
IC 702		P-2100R
IC 751		PA1004A
IC 752		KHA241
IC 791		M51958BL
Q 51 53 769 926		DTC144ES
Q 52		2SK241
Q 54		2SC2458
Q 55		2SC2059K
Q 201		2SK435
Q 202 451 452 502 605 606 702 703 704 752		2SC2458
Q 501		2SK330
Q 503 908 910 911 912 921 922		2SA1048
Q 582 758 761 767 902 903 924		2SC2458
Q 601 602 603 604 707 708 762		DTC124ES
Q 701		DTC114ES
Q 705 770 919 925		DTA144ES
Q 706 751 754 763		2SB808
Q 753 901		2SA1358
Q 755 760		DTA114TS
Q 756 759 904 905		2SB1238
Q 764 765		DTA143ES
Q 766		DTC144TS
Q 768		DTA143ES
Q 774		DTC114ES
Q 913 917		2SD601
Q 914 915		2SC2458
Q 916		DTA144ES
Q 918		DTC144ES
Q 920		DTC144ES
Q 927		DTC144TS
Q 928		DTC144ES
D 201		KV1280F1-2
D 202 253 451 452 453 454 455 456 457 458		1SS133
D 501 601 602 603 701 702 703 704 705		1SS133

Circuit Symbol & No.	Part Name	Part No.
D 502		RD3R0ESB2
D 503		MA700
D 551		SIB01-01
D 552 902		ERA15-02VH
D 553 709 753 754 904 905		1SS133
D 708		MA700
D 720 721		1SS133
D 751		2Z30
D 752		HZS3R0EB2
D 755		1SS133
D 756 791		1SS133
D 901		RD5R1JSB2
D 903		RD18JSB2
L 51	Ferri-Inductor	LAU2R2M
L 52	Inductor	LAU100K
L 201	Inductor	LCTB2R7K2125
L 202	Coil	CTF1070
L 501 751	Ferri-Inductor	LAU150K
L 551	ChokeCoil	CTH1100
L 552	Coil	CTH1077
L 752	Ferri-Inductor	LAU4R7K
L 753 754	Inductor	CTF1053
T 51	Coil	CTE1021
T 52	Coil	CTE1022
T 202	Coil	CTB-171
T 203	Coil	CTB1044
T 204	Coil	CTB1026
T 205	Coil	CTE1017
T 206	Coil	CTE1018
T 207	Coil	CTB1043
CG 51		DSP-201M
CF 51	Ceramic Filter	CTF-182
CF 52	FM Ceramic Filter	CTF-101
CF 201	Filter	CTF-100
CF 202	Ceramic Resonator	CTF1039
IB 701		CWW1222
IB 702		CWW1189
X 501	Crystal Resonator	CSS1011
X 701	Crystal Resonator	CSS1029
X 702		CPV1012
VR 51	Semi-fixed 22kΩ(B)	VRTB4VS223
VR 101	Semi-fixed 10kΩ(B)	VRTB4VS103
VR 251 252	Semi-fixed 1kΩ(B)	VRTB6VS102
VR 451	Volume 20kΩ(B)×2	CCS1201
RL	Relay	CSR1010
FU	Fuse 7.5A	CEK1135
FE 52	FM Front End	CWB1059

RESISTORS

Circuit Symbol & No.	Part Name	Part No.
R 51		RS1/10S103J
R 52 65 71 72		RS1/10S331J
R 54 210		RS1/10S153J
R 55 216		RS1/10S682J
R 56		RS1/10S392J

Circuit Symbol & No.	Part Name	Part No.
R 57 209 503 730 731		RS1/10S472J
R 58 219 220 470 725 737		RS1/10S104J
R 59		RS1/10S682J
R 60 64 211 757 777 904		RS1/10S223J
R 61 63 70 215 770		RS1/10S101J
R 62 204		RS1/10S470J
R 66 732 733 771 772		RS1/10S102J
R 67		RS1/10S101J
R 68 69		RS1/10S680J
R 73 217 716		RS1/10S221J
R 101 151 152 201		RS1/10S332J
R 102		RS1/10S333J
R 103 602		RS1/10S392J
R 104		RS1/10S203J
R 153 154 155 156 203 205 212 213		RS1/10S103J
R 202		RS1/10S471J
R 206		RS1/10S394J
R 207		RS1/10S472J
R 214 255 256 501 701 702 703 704 705		RS1/10S473J
R 218 221		RS1/10S220J
R 453 454		RD1/4PS561JL
R 455 456 465 466 751 752		RD1/4PS222JL
R 457 458		RD1/4PS393JL
R 459 460 467 468 584 719 722		RD1/4PS473JL
R 461 462		RD1/4PS103JL
R 463 464		RS1/10S182J
R 469		RS1/10S151J
R 502 755 917 918		RD1/4PS101JL
R 504 507 711 720 726 727 728 729 762 774		RD1/4PS102JL
R 505		RD1/4PS104JL
R 506		RS1/10S152J
R 551 552 553 554		RS1/10S181J
R 555 556		RD1/4PS010JL
R 582		RD1/4PS222JL
R 583 603 763 768 938		RD1/4PS103JL
R 601		RS1/10S564J
R 604		RD1/4PS562JL
R 605		RD1/4PS472JL
R 606		RD1/4PS182JL
R 706 707 708 709 710 712 713 714 715 721		RS1/10S473J
R 717		RD1/4PS224JL
R 718		RD1/4PS471JL
R 723		RD1/4PS472JL
R 724		RS1/10S472J
R 734 735 736 756 778		RS1/10S473J
R 753		RD1/4PS220JL
R 754		RS1/10S101J
R 758		RD1/4PS151JL
R 759 766		RD1/4PS6R8JL
R 760 765		RD1/4PS2R2JL
R 761 767		RS1/10S222J
R 764 769 936 937		RS1/10S103J
R 775		RS1/10S105J
R 776		RD1/4PS102JL
R 779		RD1/4PS103JL
R 791		RD1/4PS103JL
R 792		RD1/4PS223JL
R 793		RD1/4PS154JL
R 794		RS1/10S104J
R 901		RD1/4PS392JL
R 902		RD1/4PS332JL
R 903		RD1/4PS102JL
R 905 906		RD1/4PS220JL
R 908		RD1/4PS222JL
R 909		RD1/4PS222JL

Circuit Symbol & No.	Part Name	Part No.
R 910 911		RD1/4PS150JL
R 912		RD1/4PS391JL
R 913		RS1/10S681J
R 914		RS1/10S821J
R 915		RS1/10S391J
R 916		RS1/10S102J
R 922		RS1/10S152J
R 924		RD1/4PS561JL
R 928		RD1/4PS221JL
R 929		RD1/4PS821JL
R 930		RS1/10S122J
R 931		RD1/4PS222JL
R 932		RD1/4PS472JL
R 933		RS1/10S472J
R 939		RS1/10S222J
R 941		RS1/10S221J

CAPACITORS

Circuit Symbol & No.	Part Name	Part No.
C 51 55 57 61 217 506 507 510		CKSQYB103K50
C 53 151 152 205 206 211 213 221 230 703		CKSQYB223K50
C 54		CKPYX472M16L
C 56 102 103 229		CEA330M10LS
C 58 465 466 469 470 471 472 765		CEA010M50LS2
C 59 155 501 755		CKSQYB104K25
C 60		CEAR47M50LS2
C 62		CCSQCH330J50
C 63		CCSQCH101J50
C 101		CEA4R7M35NPLL
C 153 154		CKSQYB332K50
C 156		CKSQYB472K50
C 202		CEA680M10LS
C 203 227		CCSQCH220J50
C 204		CKSYF105Z25
C 207 210		CCSQCH100D50
C 208		CKSQYB333K50
C 209		CCSQCH010C50
C 212 219 220		CEAR47M50LS2
C 214 711 712 760		CKSQYB473K50
C 215 216		CQEA223J50
C 218		CEA3R3M50LS
C 222		CEAR47M50NPLL
C 224		CCSQCH471J50
C 225		CCSQCH331J50
C 226		CCSQCH750J50
C 228		CCSQCH270J50
C 251 252		CCSQSL681J50
C 253 254		CEANL4R7M35LL
C 255 256 562 574		CEAS470M25
C 257 258 559 560 571 572(US)		CEA101M10L2
C 257 258 559 560 571 572(X1H)		CEAS101M10
C 259		CEAS010M50
C 451 452		CEA4R7M35LS
C 453 454 455 456 464 764 767		CEA100M16LS2
C 457 458 459 460		CEANL010M50LL
C 461 462		CEAR47M50LS2
C 463 753		CEAS471M10
C 467		CEA101M10LS
C 473 474		CKSQYB392K50
C 502		CCSQCH180J50
C 503		CCSQCH090D50
C 504 605 606 607 608 609 610 707 752 758		CKSQYB473K50
C 505		CEA221M6R3LL
C 508	4.7μF/16V	CCH1005
C 509 705 756 768		CKSQYB223K50
C 551 552 563 564		CKSQYB102K50
C 553 554 565 566		CEAS221M10
C 555 556 567 568		CQMA224J50
C 557 558 569 570	1000μF/16V	CCH1003

Circuit Symbol & No.	Part Name	Part No.
C 561 573		CQMA154J50
C 575 585		CEAS331M16
C 581	2200 μF/16V	CCH1012
C 582	1000 μF/16V	CCH1003
C 583		CKPYF473Z50L
C 584		CEAS010M50
C 601 602		CEA470M6R3LS
C 603		CEAR68M50LS2
C 604		CKSYF224Z25
C 611		CCSCH390J50
C 612		CKSYF154Z25
C 613		CKSQYB392K50
C 701 702		CCSCH330J50
C 704 709 710		CCSCH101J50
C 706		CEA100M16LS2
C 708 751		CKSQYB102K50
C 713		CEA330M10LS
C 754		CKSYB473K50
C 757 761		CEA221M6R3LL
C 759		CASAQ100M10
C 762		CASA4R7M16
C 766	0.47 μ/5.5V	CCL1016
C 769		CEA470M16LS
C 771		CKSQYB473K50
C 772 773		CASA4R7M16
C 791		CKSYF334Z25
C 792		CKSYF105Z25
C 902		CEAS220M16
C 931		CEAS100M35

Unit Number :
Unit Name : Key Board Unit

MISCELLANEOUS

Q 951 952 953 954 955 956		2SD601
D 951	LED	BR3668S
D 952 953 954 955 956 958 959 960 LED		CL140DCB
D 962 963 964 965 966 967 968 969 970 971		CL140DCB
D 972 973	LED	CL140DCB
S 951 952 953 954 955 956 957 958 959 960		CSG1050
S 961 962	Switch	CSG1050
S 964 965	Switch	CSG1037

RESISTORS

R 951 952 953 954	RS1/10S221J
R 955	RS1/10S221J
R 956	RS1/10S391J
R 958	RS1/10S123J

Unit Number :
Unit Name : LCD Unit

MISCELLANEOUS

IC 981		LC7582A
Q 981		DTC144EK
IL 981 982 983	Lamp 8V 60mA	CEL1209
	LCD	CAW1183

RESISTORS

R 983	RS1/10S563J
R 984 985	RS1/10S102J

CAPACITORS

C 982	CCSQCH681J50
C 983	CKSYF224Z25

Unit Number :
Unit Name : Switch P.C.Board

Circuit Symbol & No.	Part Name	Part No.
S 1	Switch(CST SET)	CSN-089
S 2 3	Switch(CST IN,70 μS)	CSN1003
MR 1 2	Magnetic Resistive Device	DM-106B

Unit Number :
Unit Name : P.C.Board Unit

D 1 2 3		1S1555

Miscellaneous Parts List

HD 1	HeadUnit	CXA3551
M 1 2	Motor(Head,FF/REW)	CXA3596
M 3	Motor(Capstan)	CXM1055
D 980	LED	AA4553K-R

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XP

Service Manual

PIONEER®

ORDER NO.
CRT-468-0

CASSETTE MECHANISM ASSEMBLY

CX-156/A, CX-156/B

- This service manual is for cassette mechanism assembly used in car stereo components.
- Refer to the service manual for individual models for details on sections other than the cassette mechanism assembly.

Model	Service Manual	Cassette Mechanism Assembly
FX-K5/EW	CRT-469	CX-156/A
FX-K5B/EW		CX-156/A
FX-K5SDK/WG		CX-156/A
FEX-55/US, CA, CS	CRT-471	CX-156/A
FEX-50/ES	CRT-470	CX-156/A
KX-E60/EW	CRT-476	CX-156/B

Model	Service Manual	Cassette Mechanism Assembly

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TEL: (03) 580-9911

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1. REPLACEMENT OF PARTS IN CASSETTE MECHANISM

• Belt and capstan motor (M3) replacement

1. Remove the four screws and the cover. (Fig. 1)
2. The belt in Fig. 2 can be replaced. (Be sure that the belt is not greased and not twisted.)
3. To replace the capstan motor, remove the two screws shown in Fig. 2.

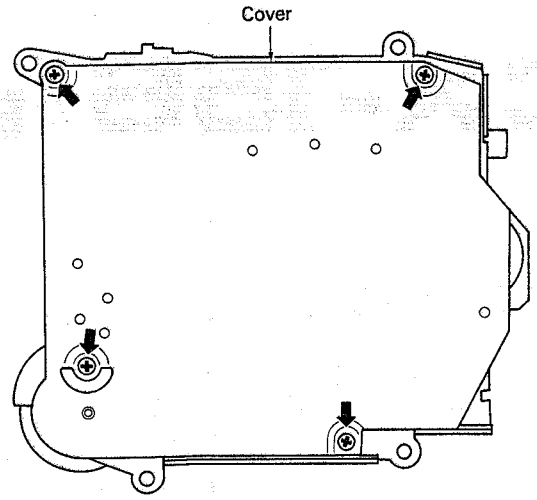


Fig. 1

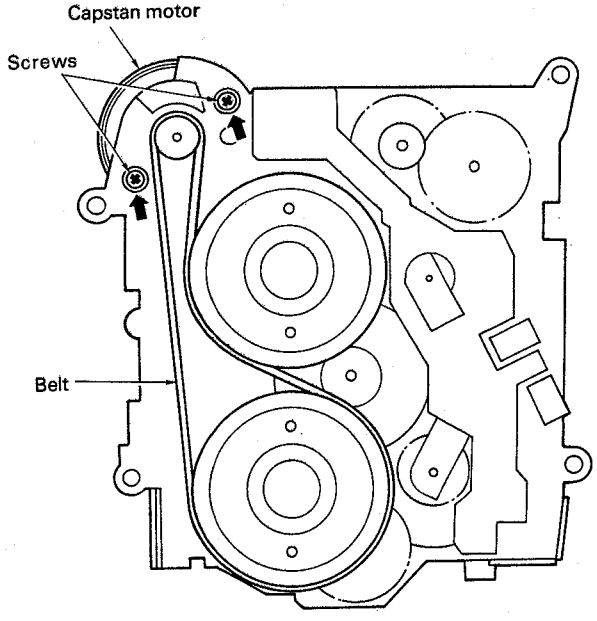


Fig. 2

• Cassette holder removal

1. Turn the capstan motor until the cassette holder drops down. (Do not turn the flywheel directly by hand.)
2. Remove the screw labeled "B", the collar and the spring.
3. Remove unit "A" and the cassette holder "D" and "E".

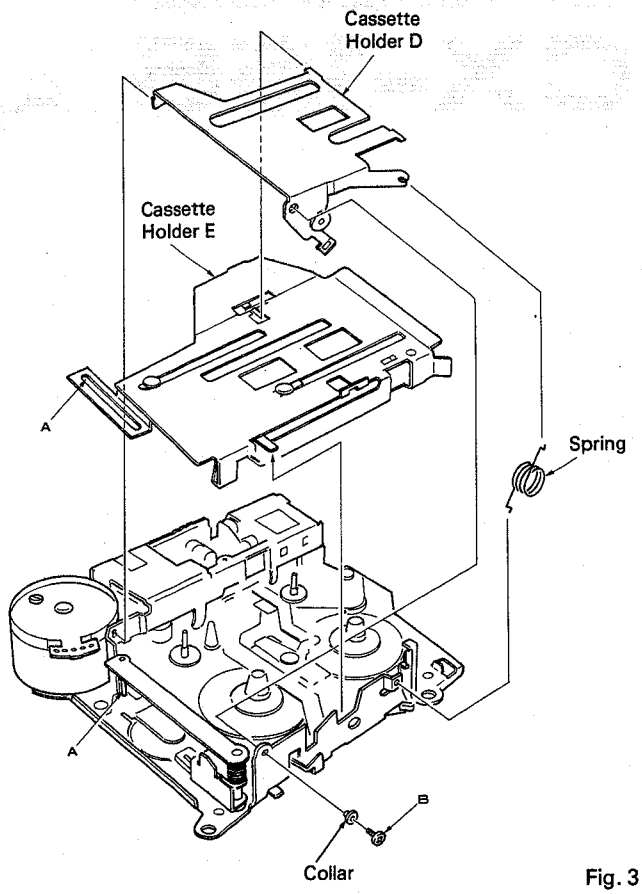


Fig. 3

• Head unit replacement

1. Remove the washer and spring.
2. Remove the screw labeled "F", and the head unit can be removed in the opposite direction.
3. Be careful of the following point during reassembly.
   - Put the head unit pins through the lever holes. (One in front and one in back.)

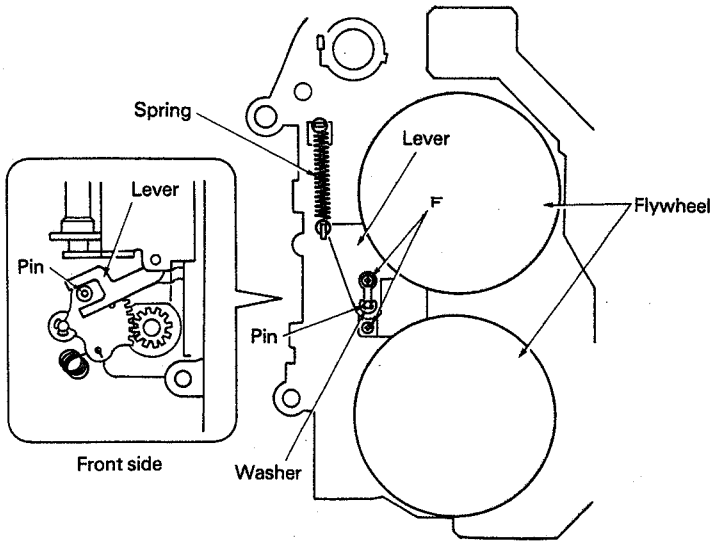


Fig. 4

• Sub-motor replacement (M1 and M2)

1. Remove the two screws labeled "G" and remove the P.C. board unit.
2. The sub-motor can be removed by removing the three screws indicated by the arrows.
3. Sub-motor 2 (for switching the FF/REW gear) can be replaced when the spacer has been removed. (The motor fits very snugly, so some force must be used to remove it.)
4. Sub-motor 1 (for turning and positioning the head) can be replaced by removing the belt, lock washer, pulley and two screws labeled "J".

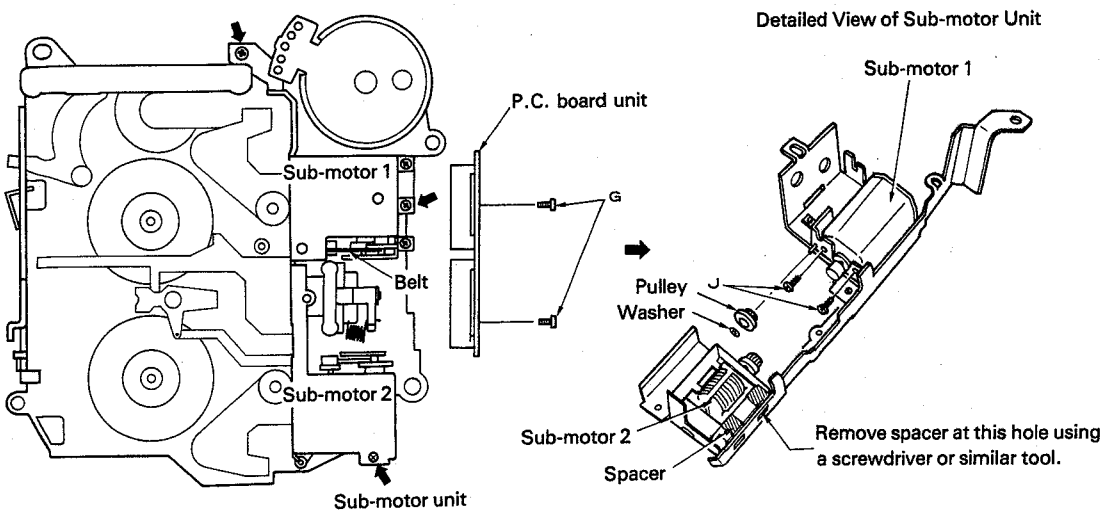


Fig. 5

• Reel unit replacement

1. Remove the six screws and the switch P.C. board.
2. Remove the screw labeled "K" and the collar and free the FF/REW idler gear.
3. The reel assy can be replaced by removing the two screws labeled "L" and removing the reel unit.

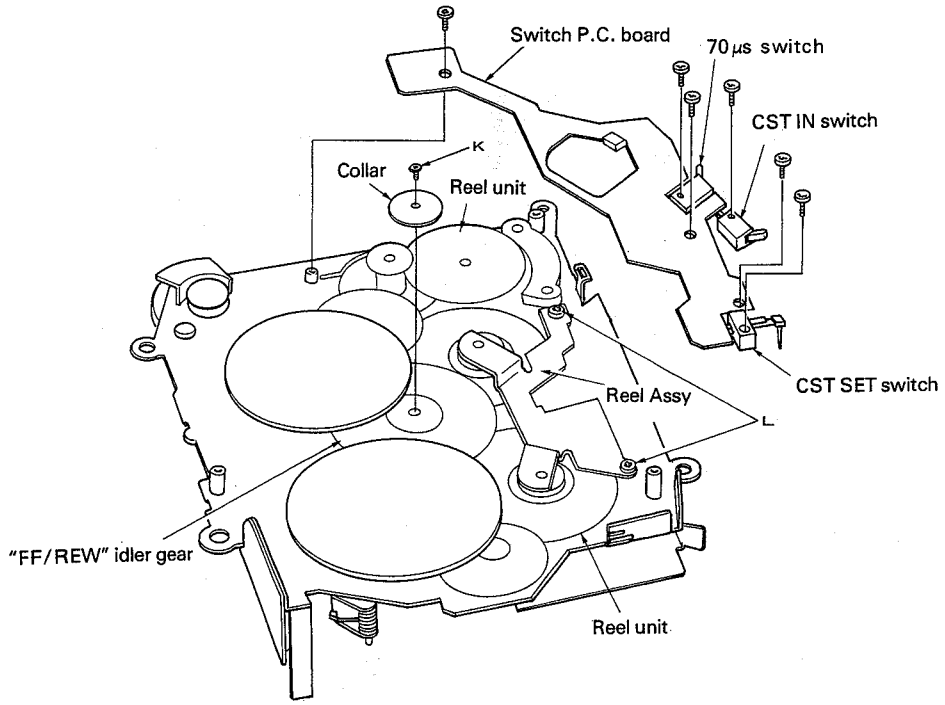


Fig. 6

2. MECHANISM DESCRIPTION

Cassette mechanism assy for CX-156/A is used in this mechanism description.

1. Outline of Mechanism

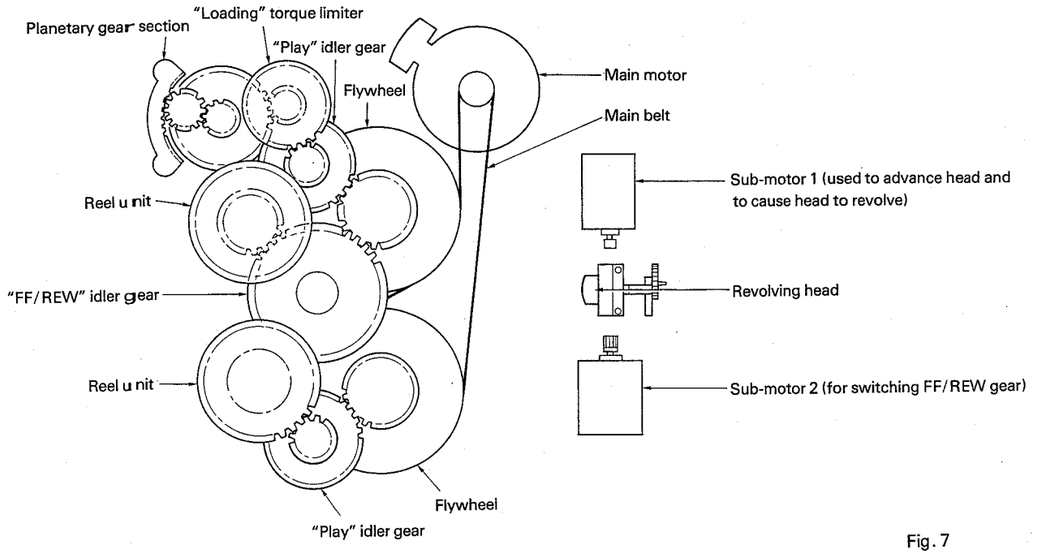


Fig. 7

2. Loading/Eject Function

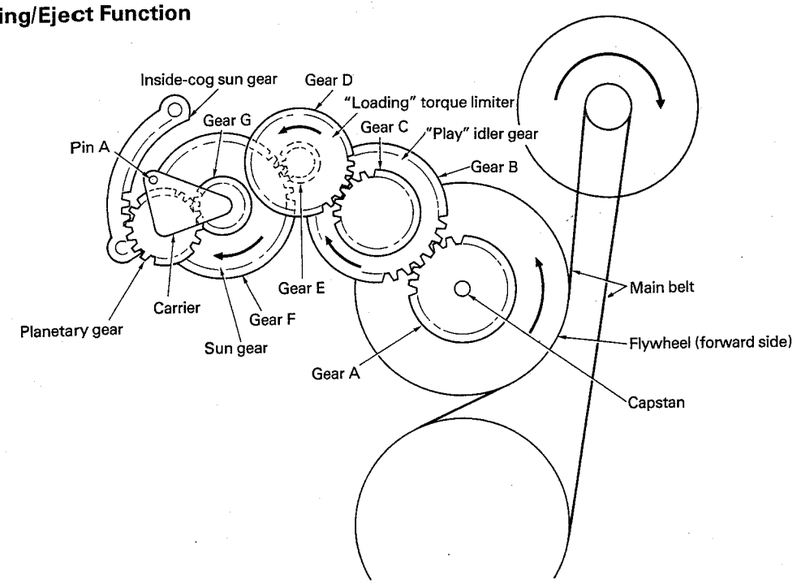


Fig. 8

3. Cassette Tape Load and Eject Mechanism

• Cassette tape loading operation

1. Push the cassette tape lightly in the direction indicated by the arrow. (As shown in Fig. 10, arm "A" and arm "B" connect to spring "A". These are also connected to common axis shaft "A", which is attached to the chassis surface and acts as a swivel. Pin "A", which is caulked to the planetary gear unit carrier, goes through the chassis and fits into the oblong hole of arm "B". Because pin "A" won't move as long as the capstan motor isn't moving, arm "B" won't move either.)
2. When a cassette tape is loaded, arm "A" moves in the direction indicated by the arrow and spring "A" loosens. Lever "A" also moves in the direction indicated by the arrow, and the catch at left of the lever releases arm "C". Arm "C" then turns counterclockwise and opens the CST IN switch. The capstan motor then begins turning forward.
3. The carrier then moves clockwise because the planetary gear moves along the inside-cog sun gear. Pin "A" which is caulked to the carrier also moves in the same direction. (Fig. 11) The movement of pin "A" is causing arm "B" to move counterclockwise. Arm "A" turns in the same fashion and the "A'" unit of lever "A" draws the cassette tape in. (Fig. 9)

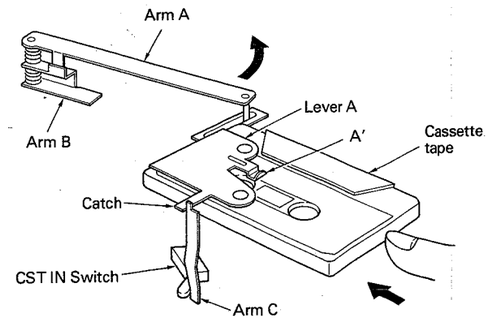


Fig. 9

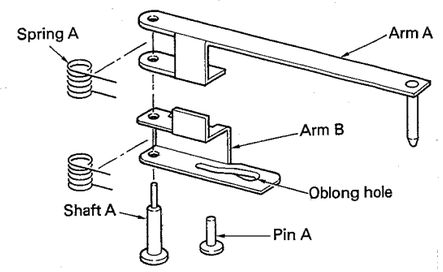


Fig. 10

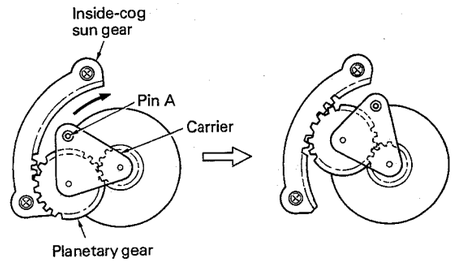


Fig. 11

4. The oblong hole of arm "B" is as shown in Fig. 12. The cassette tape draw-in process will be complete when the pin "A" degree of rotation is θ. Arm "B" will not move while the degree of rotation is θ'.

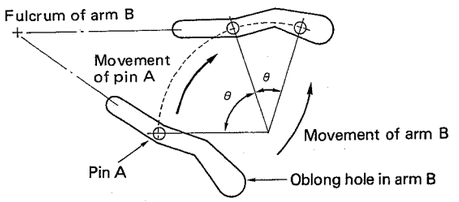


Fig. 12

5. As shown in Fig. 13, arm "C" (caulked to the chassis swivel) is fixed to pin "A" and when the degree of rotation is θ arm "C" is stationary, and when it is θ' arm "C" turns clockwise.

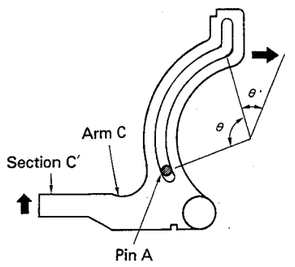


Fig. 13

6. As shown in Fig. 14, the "C'" unit of arm "C" connects to the cassette arm (which suspends the cassette tape) through spring "C". The arm "C" movement described above in paragraph five makes the "C'" unit move in the direction indicated by the arrow in Fig. 14. The cassette arm pushes down holder "A" by means of spring "B". The "C'" unit is released when holder "A" drops down.
7. In order for the capstan motor to keep turning forward, the planetary gear disengages from the inside-cog sun gear and becomes free.

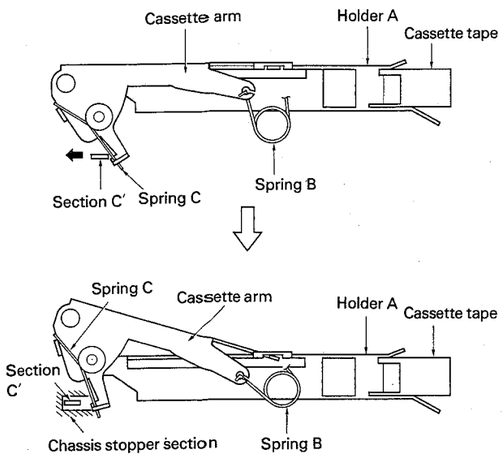


Fig. 14

• Eject operation

1. Turning on the eject switch reverses the capstan motor. As shown in Fig. 15, spring "D" places slight friction on the planetary gear which causes it to engage with the inside-cog sun gear. The cassette tape is ejected following an operation opposite to the loading operation.

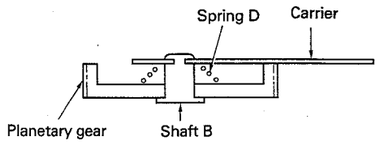


Fig. 15

4. Head Turning and Head Positioning Operations (during forward play)

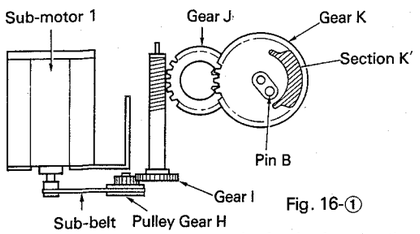


Fig. 16-①

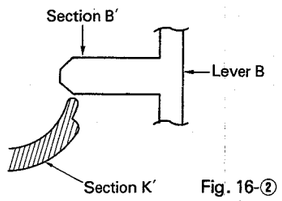


Fig. 16-②

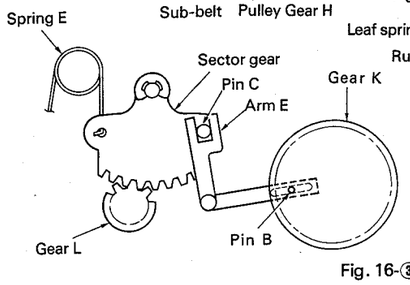


Fig. 16-③

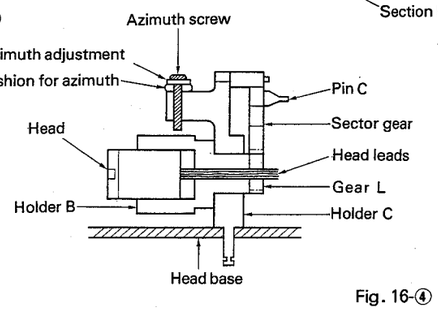


Fig. 16-④

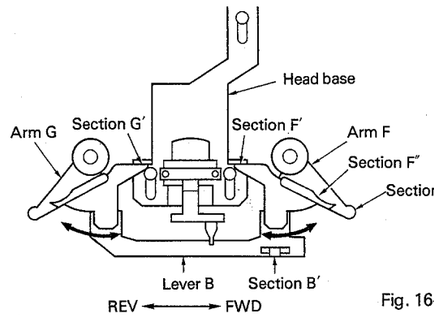


Fig. 16-⑤

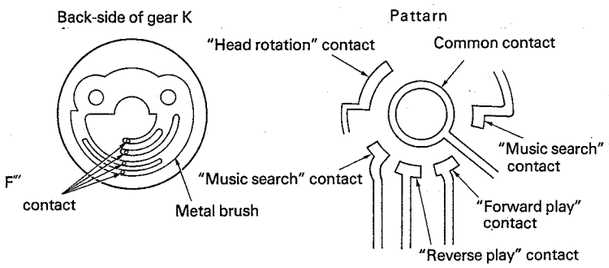
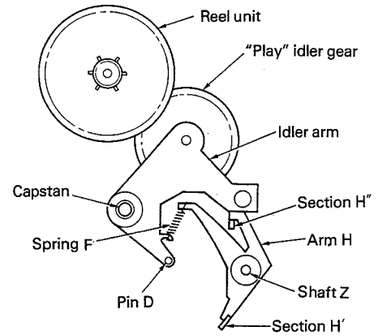


Fig. 16-⑥



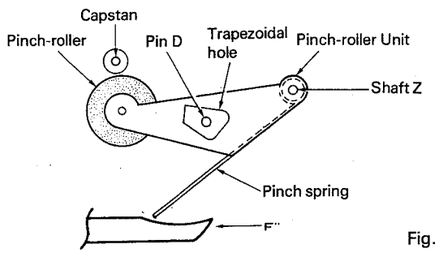


Fig. 17

1. The sub-belt from sub-motor 1 goes through pulley gear "H", gear "I", gear "J" and turns gear "K". Head turning and head base positioning take place using the "K'" unit (the projecting unit) of gear "K" and pin "B". There is a metal brush attached to the back of gear "K" which detects the passing through of all patterns and common patterns and stops sub-motor 1. This controls the head positioning, the head turning, the contact pressure of the play idler gear and the contact pressure of the pinch roller.
2. Head turning at pin "B" takes place until gear "K" starts turning which brings the "K'" part into contact with the lever "B", "B'" part. (Fig. 16-③)
3. Pin "B" engages with the arm "E" oval opening and rotates arm "E". The arm "E" sector gear is engaged with pin "C" and this turns the head. The head rotation pattern (Fig. 16-⑥) performs this operation inside a certain angle.
4. When gear "K" turns it also pushes the lever "B", "B'" part. The "B'" part turns arm "F" and arm "G" counter-clockwise and advances head base with the arm "G", "G'" part. (Fig. 16-②, ⑤)
5. After the head base goes beyond the MS pattern (Fig. 16-⑥) position, the arm "F", "F'" part pushes the pinch roller unit pinch spring and presses the pinch roller down onto the capstan. (Fig. 17)
6. Simultaneously, the arm "F", "F" unit pushes the arm "H", "H" part. The "H'" part lock releases when pushed, and the play idler gear comes into contact with the reel unit. Play operation begins because of this. (Fig. 16-⑤, Fig. 17)
7. When going from play to eject, first, the pinch roller disengages from the capstan, and then using the pinch roller unit trapezoidal hole, releases the idler arm from the reel unit by means of pin "D". After that, the "H'" unit again meshes with the idler arm and the "play" idler gear stops after completely disengaging from the reel unit.

5. FF/REW Operation

1. As with the head operations a brush is attached to the back of gear "P" and using patterns and the brush, position sensing takes place and this controls the FF/REW operation.
2. Sub-motor 2 goes through gears "L", "M" and "N" and turns gear "P". When gear "P" turns, arm "I" rotates by means of arm "J". Arm "I" rotates the FF/REW idler gear and engages it with the reel unit.

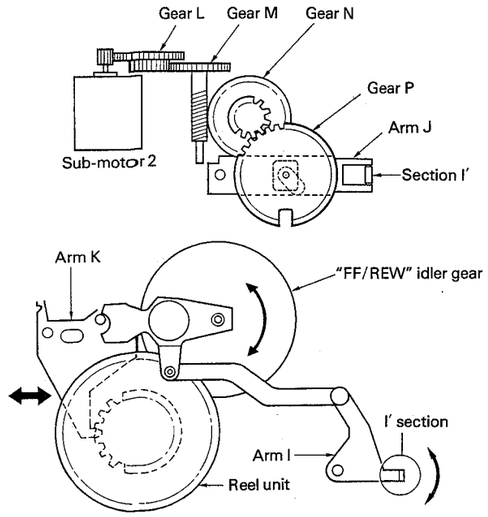


Fig. 18

3. ADJUSTMENT

3.1 AZIMUTH ADJUSTMENT

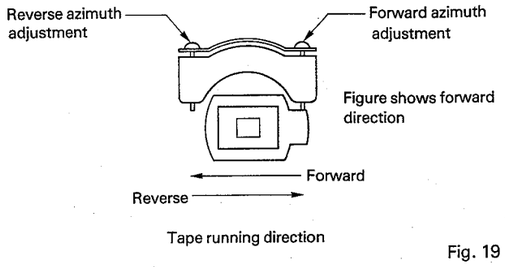


Fig. 19

• To Adjust

1. Play "A" side of STD-341A (10 kHz, −20 dB). Adjust each screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

3.2 TAPE SPEED ADJUSTMENT

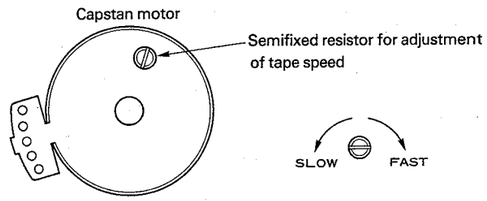
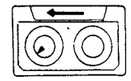
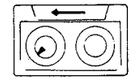
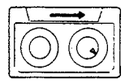
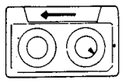


Fig. 20

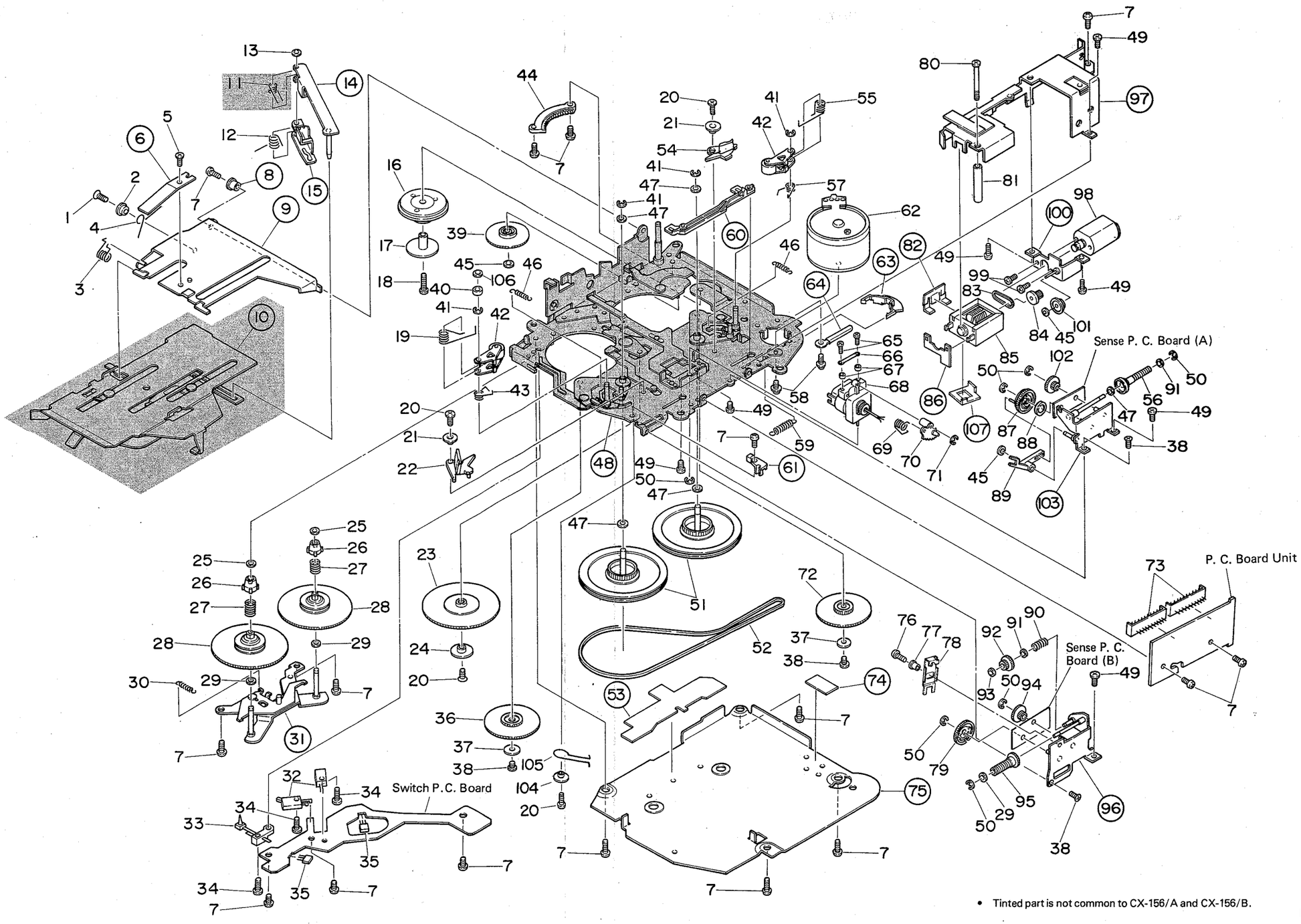
• To Adjust

1. Reproduce STD-301 (3 kHz, −10 dB). Adjust the semifixed resistor so that the frequency counter shows 3,010 Hz (+30 Hz, −30 Hz).

3.3 CHECK POINTS OF CASSETTE MECHANISM

Confirm the following items when replacing parts of the cassette mechanism.	■ Tape speed deviation: 3,000 $^{+90}_{-30}$ Hz (4.76 cm/s $\pm^{3}_{1}$%) Using an STD-301, measure the speed at the start and end of winding and see that a deviation remains within the limits each time. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5∼6 seconds.	■ Wow and flutter: Less than 0.15% (WMS) Using an STD-301, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 ∼ 6 seconds.
■ Fast forward and rewinding time: 95 ∼ 115 seconds Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.	■ Winding torque: 40 ∼ 60g • cm  Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 5 ∼ 6 seconds.	■ F.F. torque: 70 ∼ 110g • cm  Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.
■ REW torque: 70 ∼ 110g • cm  Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.	■ Back tension torque: 2.0 ∼ 3.5g • cm  After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.	■ Cassette loading force: 450 ∼ 550 g Push the center of the cassette and measure the force with a tension meter (1 kg).

4. EXPLODED VIEW



• Tinted part is not common to CX-156/A and CX-156/B.

Fig. 21

NOTE:

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
  ★ ★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

Mark	No.	Part No.	Description
	1.	HBA-193	Screw M1.4×3.5
	2.	CLB-691	Collar
	3.	CBH-837	Spring
	4.	CBH-867	Spring
	5.	HBA-147	Screw M1.4×1.4
	6.		Spring
	7.	BMZ20P040FMC	Screw
	8.		Bush
	9.		Arm
	10.		Holder Unit (CX-156/A)
			Holder Unit (CX-156/B)
	11.	CBH-836	Spring (CX-156/A)
		CBH-887	Spring (CX-156/B)
	12.	CBH-886	Spring
	13.	CBF-046	Washer
	14.		Arm Unit
	15.		Arm
	16.	CXD-388	Gear Unit
	17.	CLB-617	Collar
	18.	CBA-166	Screw M1.7×8
	19.	CBH-832	Spring
	20.	HBA-310	Screw M2×3.5
	21.	CLB-612	Collar
	22.	CNW-930	Arm
	23.	CNW-944	Gear
	24.	CLB-616	Collar
	25.	CBF-135	Washer
	26.	CNW-932	Collar
	27.	CBH-827	Spring
★★	28.	CXD-384	Reel Unit
	29.	CBF-088	Washer
	30.	CBH-868	Spring
	31.		Bracket Unit
★★	32.	CSN-091	Switch (70μs, CST IN)
★★	33.	CSN-089	Switch (CST SET)
	34.	CBA-172	Screw M1.7×5.5
★	35.	SDME106A	Magnetic Resistive Device
	36.	CNW-943	Gear
	37.	CLB-615	Collar
	38.	HBA-209	Screw M2×2
	39.	CNW-950	Gear
	40.	CLB-690	Roller
	41.	EBG-001	Washer
★★	42.	CXD-387	Pinch Roller Unit
	43.	CBH-834	Spring
	44.	CNW-951	Gear
	45.	CBF-126	Washer
	46.	CBH-835	Spring
	47.	HBF-179	Washer
	48.		Chassis Unit (CX-156/A)
			Chassis Unit (CX-156/B)
	49.	HBA-175	Screw M2×2.5
	50.	YE12FUC	Washer
	51.	CNW-942	Flywheel
★★	52.	CNT-111	Belt

Mark	No.	Part No.	Description
	53.		Insulator
	54.	CNW-931	Arm
	55.	CBH-831	Spring
	56.	CNW-956	Gear
	57.	CBH-833	Spring
	58.	PMS26P030FMC	Screw
	59.	CBH-830	Spring
	60.		Lever
	61.		Spacer
★★	62.	CXM-161	Motor (Capstan)
	63.		Clamper
	64.		Clamper
	65.	CBA-173	Screw M1.4×8
	66.	CBE-114	Spring
	67.	CNY-134	Azimuth Rubber
★★	68.	CXD-758	Head Unit
	69.	CBH-829	Spring
	70.	CNW-939	Gear
	71.	YE15FUC	Washer
	72.	CNW-943	Gear
	73.	CKS-534	Plug
	74.		Insulator
	75.		Cover
	76.	HBA-158	Screw M1.4×5
	77.	CLB-750	Collar
	78.	CNH-004	Arm
	79.	CNW-953	Gear
	80.	CBA-165	Screw M2
	81.	CLB-749	Spacer
	82.		Spacer
★★	83.	CNT-114	Belt
	84.	CNW-941	Gear
★★	85.	CXM-351	Motor (Gear Position)
	86.		P.C. Board
	87.	CNW-952	Gear
	88.	CNN-481	Spacer
	89.	CNW-958	Arm
	90.	CBH-866	Spring
	91.	HBF-116	Washer
	92.	CNW-954	Gear
	93.	CBF-135	Washer
	94.	CNY-077	Gear
	95.	CNY-148	Gear
	96.		Holder Unit
	97.		Guide
★★	98.	CXM-452	Motor (Head Position)
	99.	HBA-244	Screw M1.4×1.6
	100.		Bracket Unit
	101.	CNY-075	Pulley
	102.	CNW-955	Gear
	103.		Holder Unit
	104.	CLB-760	Collar
	105.	CBH-893	Spring
	106.	HBF-180	Washer
	107.		Cover

5. CONNECTION DIAGRAM

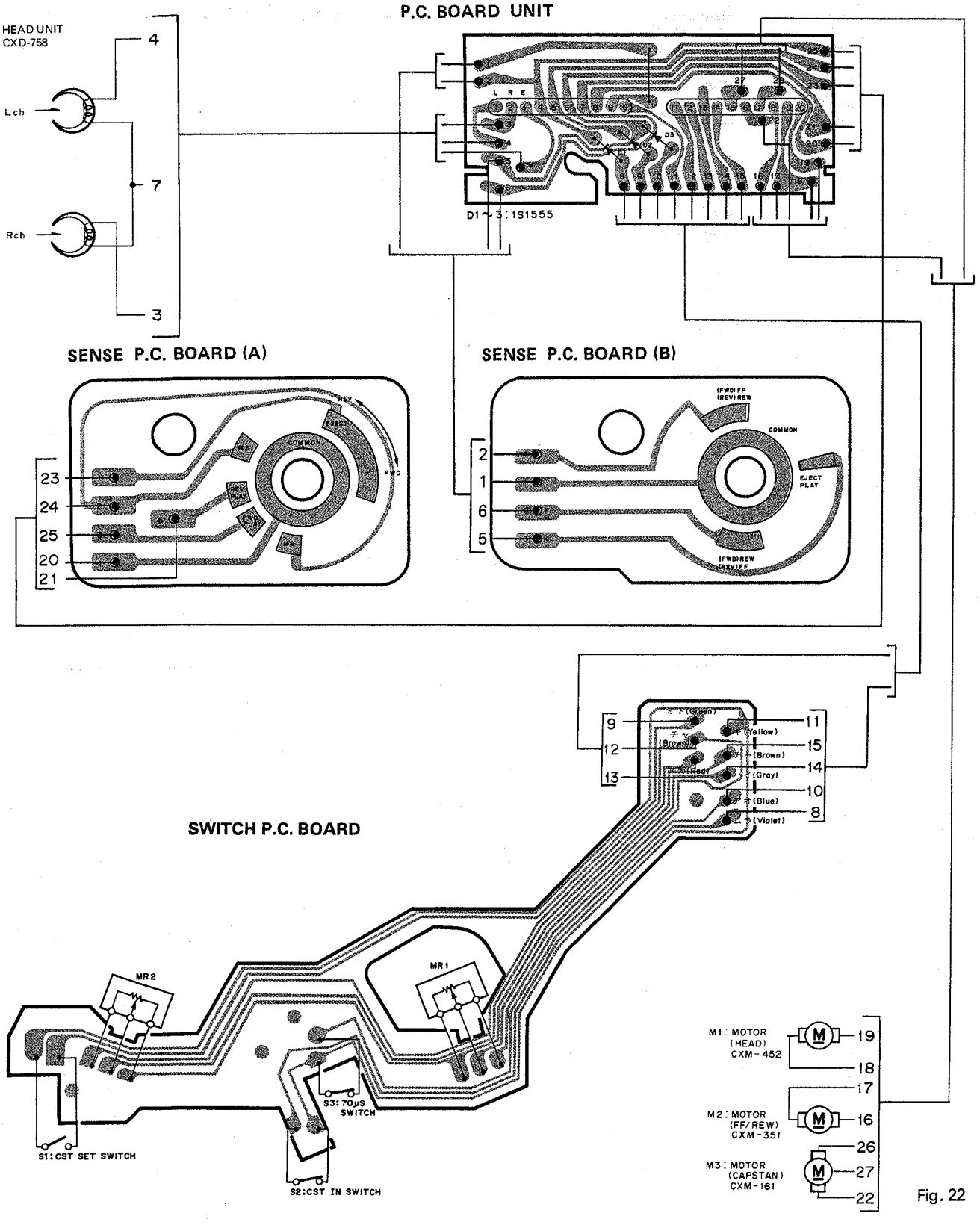
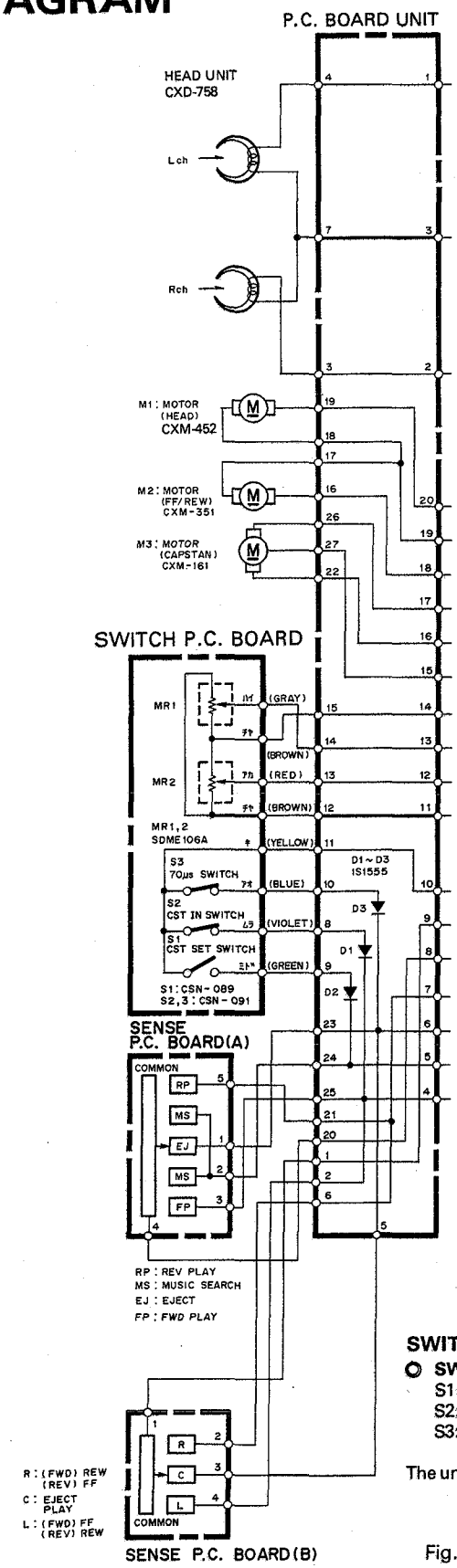


Fig. 22

6. SCHEMATIC CIRCUIT DIAGRAM



SWITCHES

○ SWITCH P.C. BOARD

S1: CST SET SWITCH ..... ON—OFF
S2: CST IN SWITCH ..... ON—OFF
S3: 70μs SWITCH ..... ON (120μs)—OFF (70μs)

The underlined indicates the switch position.

Fig. 23

7. ELECTRICAL PARTS LIST

Switch P.C. Board

Mark	Symbol & Description		Part No.
★★	S1	Switch (CST SET)	CSN-089
★★	S2, S3	Switch (CST IN, 70μs)	CSN-091
★	MR1, MR2	Magnetic Resistive Device	SDME106A

P.C. Board Unit

Mark	Symbol & Description	Part No.
★	D1 — D3	1S1555

Miscellaneous Parts List

Mark	Symbol & Description		Part No.
★★	Head Unit		CXD-758
★★	M1	Motor (Head)	CXM-452
★★	M2	Motor (Gear)	CXM-351
★★	M3	Motor (Capstan)	CXM-161